

2-C
PORTAL 19 SCREENING LEVEL 3
DOCUMENTATION

**FINAL
ENVIRONMENTAL
IMPACT STATEMENT**

**Brightwater
Regional Wastewater
Treatment System**

APPENDICES

Final

Appendix 2-C Portal 19 Screening Level 3 Documentation

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King County

Department of Natural Resources and Parks
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Table of Contents

Introduction	1
Purpose	1
Project Background	2
Relationship to Final Environmental Impact Statement	3
Level 3 Screening Process	4
Candidate Sites	4
Evaluation Methodology	4
Evaluation Factors	6
Outfall Factors	14
Key factors	14
Secondary Factors	17
Summary of Level 3 Portal Screening Results	30

List of Tables

Table 1. Portal 19 Candidate Sites for Route 9–195th Street Conveyance System	4
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List of Figures

Figure 1-A. Portal Siting Area 19 with Candidate Sites	
Figure 1-B. Portal Siting Area 19 with Candidate Sites	

List of Appendices

Appendix A. Evaluation Factors used in Level 3 Screening Process for Portal 19	
Appendix B. Level 3 Screening Matrix for Portal 19	
Appendix C. Evaluation Summary of Portal 19 Level 3 Candidate Sites	

Introduction

King County has prepared a Draft Environmental Impact Statement (Draft EIS) and Final Environmental Impact Statement (Final EIS) on the Brightwater Regional Wastewater Treatment System. The Final EIS is intended to provide decision-makers, regulatory agencies and the public with information regarding the probable significant adverse impacts of the Brightwater proposal and identify alternatives and reasonable mitigation measures.

King County Executive Ron Sims has identified a preferred alternative, which is outlined in the Final EIS. This preferred alternative is for public information only, and is not intended in any way to prejudge the County's final decision, which will be made following the issuance of the Final EIS with accompanying technical appendices, comments on the Draft EIS and responses from King County, and additional supporting information. After issuance of the Final EIS, the King County Executive will select final locations for a treatment plant, marine outfall and associated conveyances.

The County Executive authorized the preparation of a set of Technical Reports, in support of the Final EIS. These reports represent a substantial volume of additional investigation on the identified Brightwater alternatives, as appropriate, to identify probable significant adverse environmental impacts as required by the State Environmental Policy Act (SEPA). The collection of pertinent information and evaluation of impacts and mitigation measures on the Brightwater proposal is an ongoing process. The Final EIS incorporates this updated information and additional analysis of the probable significant adverse environmental impacts of the Brightwater alternatives, along with identification of reasonable mitigation measures. Additional evaluation will continue as part of meeting federal, state and local permitting requirements.

Thus, the readers of this Technical Report should take into account the preliminary nature of the data contained herein, as well as the fact that new information relating to Brightwater may become available as the permit process gets underway. It is released at this time as part of King County's commitment to share information with the public as it is being developed.

Purpose

The purpose of this report is to document the Level 3 portal screening process and evaluation results for the Portal 19 candidate sites. The Level 1 and 2 portal screening processes were used to identify and evaluate suitable candidate sites within the portal siting areas that were identified in the Brightwater Draft EIS. A Technical Report is available that describes the Level 1 and 2 portal screening. Portal siting areas are the 72-acre siting circles which were selected based on the engineering requirements for the design and construction of conveyance. In the Level 3 screening process, a detailed evaluation of the candidate sites identified in the Level 2 screening was performed to identify the most suitable portal site within each portal siting area. Identification of the site for Portal 19 was critical for designing the outfall for the proposed Route 9 conveyance alternatives so the selection of the preferred site was accelerated. Level 3 evaluation results for the other four primary portal sites for the Preferred Alternative will be conducted at a later date and results will be included in a subsequent report.

This report provides:

- Project background on the Brightwater Wastewater System

- Methodology used in the Level 3 portal screening process
- Factors used to evaluate the candidate sites within proposed Portal 19 and the reason for inclusion of these factors
- Evaluation data and summary results of each candidate site for proposed Portal 19

Project Background

The Brightwater Regional Wastewater Treatment System Project (Brightwater Project) was initiated to implement the regional policy mandate (contained in the Regional Wastewater Services Plan [RWSP]) for development of a new regional wastewater treatment system in north King County or south Snohomish County by 2010. The RWSP and this regional policy mandate are intended to address continued growth throughout King County and Snohomish County (and the corresponding demand for additional wastewater infrastructure) and to protect human health and the environment by providing high-quality wastewater treatment and conveyance services to this region. The Brightwater System will include a treatment plant to provide secondary treatment of wastewater, pipelines to convey wastewater to and from the plant (conveyance), and a marine outfall to discharge the treated wastewater to Puget Sound.

The Brightwater alternative analysis began with a comprehensive siting study that identified and screened potential sites, evaluated associated conveyance systems, and investigated potential marine outfall locations. The adopted siting process was a three-phase approach involving extensive research, geographical information system analysis, field investigation, public involvement and stakeholder input, and consultation with local municipalities. The goal of Phase I was to use King County Council-adopted policy siting criteria to identify a small group of potential sites for the treatment plant from a pool of over 100 potential sites. King County completed Phase I in May 2001, having identified six candidate sites for the treatment plants and eight candidate outfall zones in Puget Sound. On May 14, 2001, the King County Council accepted the candidate sites for the treatment plant and outfall zones for further evaluation, as well as a set of refined policy criteria for use in narrowing the number of sites under Phase II.

Phase II considered complete “candidate systems” for each of the six candidate sites; each system included a conceptual treatment plant layout, two construction options for the conveyance pipes serving the plant, and two options for where the marine outfall would be located. One conveyance construction option involved burying the pipes at relatively shallow depths using surface trenching, and the other involved tunneling the pipes deep underground.

On September 17, 2001, the King County Executive transmitted a recommendation to the King County Council to advance two alternative treatment plant sites to Phase III for environmental review in an Environmental Impact Statement (EIS). Three system alternatives based on those sites are evaluated in the Draft EIS. One system alternative is based on siting the Brightwater Treatment Plant at the Unocal site in Edmonds. Two system alternatives are based on siting the Brightwater Treatment Plant at the Route 9 site in unincorporated Snohomish County just north of the City of Woodinville.

Based on the results of the Phase III evaluation, three action alternatives and a no action alternative were identified and evaluated in the Draft EIS. The Draft EIS was released on November 6, 2002 for public comment. The action alternatives were:

- **Route 9–195th Street System (Preferred Alternative)** - A treatment plant at the Route 9 site with conveyance pipelines in deep tunnels primarily under 195th and 205th Streets and a marine outfall off Point Wells to Outfall Zone 7S.
- **Route 9–228th Street System** - A treatment plant at the Route 9 site with conveyance pipelines in deep tunnels primarily under 228th Street SE and a marine outfall off Point Wells to Outfall Zone 7S.
- **Unocal System** - A treatment plant at the Unocal site with an influent pipeline to carry untreated wastewater from King County's existing pipelines near SR-405 in Bothell through Kenmore and Lake Forest Park to Edmonds and a marine outfall located off Point Edwards in Outfall Zone 6.

The King County Executive identified the Route 9–195th Street System as the preferred alternative because of its relative efficiencies and flexibility over the others.

Relationship to Final Environmental Impact Statement

The conveyance facilities for each of the three system alternatives in the Draft EIS consisted of 1000-foot wide corridors with portal siting areas identified approximately every 10,000 feet. A total of 22 portal siting areas were identified along the conveyance corridors for all of the alignments. Portal siting areas consisted of 2,000-foot diameter (72 acre) areas within which one to two acres would be used for portal construction. Portals would be designed as an access point for the tunnel boring equipment to be launched and received during the construction of the tunnel.

Subsequent to the Draft EIS, an identification and screening process was applied to the 72-acre portal siting areas to identify multiple candidate sites for portal construction. The screening process consisted of Level 1 and Level 2 screening. In Level 1 screening, sensitive areas such as wetlands, streams, critical habitat, high quality uplands, and known cultural and historical resources, were identified within the 72-acre portal siting area. Multiple candidate sites were selected from the remaining area to avoid or minimize impacts to sensitive areas, wherever possible. Level 2 screening consisted of evaluating the multiple candidate sites and narrowing the list to two to four candidates per portal siting area.

During Level 2 portal screening, multiple candidate sites were evaluated within each portal siting area. Candidate sites were evaluated based on criteria from four categories: engineering, community and environment, land acquisition, and financial. These criteria were used to determine the relative suitability of the candidate sites so the preferred site could be selected.

The Level 2 candidate sites (two to four per portal) will be included in the Final EIS for each of the portal siting areas. For Portal 19, a preferred candidate portal site was identified to evaluate and design the outfall for the Route 9 conveyance system alternatives. If the preferred Route 9-195th System alternative is selected for construction, then Level 3

screening results will be released for the other four primary portals on the Route 9–195th Street System after the Final EIS is issued.

Level 3 Screening Process

The Level 3 screening process was designed to evaluate the two to four Level 2 candidate sites in detail and identify the best apparent site within the 72-acre siting areas identified in the Draft EIS.

Portal 19 has design considerations that required acceleration of the selection of the best apparent portal site since the outfall would begin at Portal 19. Identification of the preferred site for Portal 19 was performed in support of the outfall planning and design for the preferred Route 9–195th Street System. If the preferred Route 9 – 195th System alternative is selected for construction, then the Level 3 screening will be used to identify the best apparent portal sites for the other four primary portal sites on the Route 9–195th Street Conveyance System at a later date.

Candidate Sites

Level 3 screening process was performed for proposed Portal 19 for the preferred Route 9–195th Street System. Portal 19 candidate sites are shown on Figures 1A and 1B. Table 1 includes a list of the candidate sites, their size, and current use for Portal 19.

Table 1. Portal 19 Candidate Sites for Route 9–195th Street Conveyance System

Site	Size (Acres)	Current Use	Jurisdiction
A	1.9	Undeveloped (Vacant) Land	Woodway
C	4.6	Petroleum Refining	Snohomish County
E	3.4	Utility - Public	Shoreline

Evaluation Methodology

The Level 3 screening process was intended to evaluate the candidate sites for Portal 19 in detail. A list of 64 evaluation factors was developed. These factors consist of broad categories including engineering, outfall, community and environment, permitting, land acquisition, financial and mitigation potential. These factors were used to test the relative suitability of candidate sites and were based on measurable physical properties. The technical group initially identified the important issues pertinent to construction and operation at the portal sites under each broad category. These issues or factors were addressed by an evaluation question. For example, the ability of a candidate site to provide adequate vehicle access was assessed through an evaluation factor with the following question: “What improvement would be needed for access to the site?”

To establish a systematic response that would allow comparison among the candidate sites, a relative rating scale was used for each evaluation question. Some scales are quantitative based on specific measurement such as length of the tunnel from the tunnel corridor to the

portal site; however, most of the scales are qualitative involving best professional judgments. For example, in relation to the above stated question, the scale was developed based on required access road improvement. The scale developed to assess condition for construction access to the candidate sites was:

High – New access road needs to be constructed, difficult construction with high cost.

Medium – New access road needs to be constructed with lower construction cost or improvement on existing access-way required.

Low – Existing access-way is adequate with minor improvement.

No – No improvement required.

Some scales were used to assess potential constraints or disadvantages, while others assessed potential opportunities or benefits. With respect to a scale that measured a potential constraint, a ‘high’ would indicate a highly-constrained candidate site; whereas on a scale that measured potential benefits, a ‘high’ would represent a benefit associated with the candidate site.

To reflect the relative importance among the evaluation factors, candidate sites were evaluated using the factors with a tiered approach. Twenty-three of the factors were given high priority in determining the relative ranking of candidate sites because they were found to be the most distinguishing factors in the screening process and allowed the team to determine the differences between candidate sites. These were classified as the ‘key factors’ and were given higher weighting in the evaluation process. Nineteen factors were considered as ‘primary’ and these were given intermediate priority in the evaluation process. Twenty-two factors were considered to be secondary and the study team determined that these would have lower weightings in Level 3 screening. The evaluation factors used in Level 3 screening process for proposed Portal 19 are listed in Appendix A.

Each candidate site was subjected to 64 evaluation factors, forming a matrix. The specific questions, scales, and ratings used to evaluate each candidate site are compiled into an evaluation matrix table contained in Appendix B. After completion of the evaluation matrix, the ratings were loaded into a numerical decision model used to compile the overall relative performance of candidate sites.

Criterion Decision Plus & Weightings of Evaluation Factors

A commercially available decision software, known as Criterion Decision Plus, was used to organize the performance criteria, manage the large volume of data, and produce an analytical perspective of which candidate sites perform the best within each of the portal siting areas. The model was designed to establish the relative contribution of factors from technical (engineering), community and environment, land acquisition, and financial evaluations. The model was a tabulation tool.

The evaluation factors were assigned weights by the project screening team to reflect the relative importance of the broad categories of engineering, outfall, community and environment, permitting, land acquisition, and financial. These weights were used in the model and assisted in understanding the sensitivity of the results to the weights and relative number of factors.

The evaluation factors specifically related to the outfall category were considered the most important for proposed Portal 19 since the location of the portal site impacts the location, design, and construction methods for the outfall. The outfall category, comprised of nine evaluation factors, was given a weighting of 50 percent. Impacts to the community and environment during construction and operation at proposed Portal 19 were considered and assigned a critical weight of 30 percent which included 22 evaluation factors. Engineering was assigned a weight of 10 percent, since issues included in this category can add cost and construction impacts to the project. A total of 19 evaluation factors were included in this category. Land acquisition was assigned 10 percent, which contained ten evaluation factors. Two evaluation factors were included in the Permitting category. Mitigation opportunity and financial categories had one evaluation factor each. Since the evaluation factors for the permitting, mitigation opportunity and financial categories were less critical than other categories such as outfall, and community and environment, and there were fewer factors, a small weight of less than 1 percent was assigned to these categories.

Weighting for each evaluation factor under each broad category was estimated based on the total assigned weight of that category and the relative importance among the evaluation factors within that category. Key factors addressed the most important issue and, therefore, were assigned a high weighting. Primary factors addressed important issues but not as critical as key factors and, therefore, were assigned a lower weight. Secondary factors addressed other less important issues and were assigned a base weight. A base weight for secondary factors was determined such that the sum of the weight of all evaluation factors under each category equals the assigned weight of that category.

A score was generated for each of the candidate sites using the model. The score is the cumulative representation of how well the candidate site performed relative to the performance criteria. If a candidate site performed perfectly on all criteria, its score would be 1.00.

Evaluation Factors

The evaluation factors selected by the technical group to evaluate the candidate sites in the Level 3 screening process addressed the issues from broad categories of engineering, community and environment, land acquisition, outfall, permitting, financial and mitigation potential. In this section the evaluation factors are discussed under each category.

Engineering Factors

The engineering category is comprised of 19 evaluation factors that focused on engineering and construction criteria. Eight factors were considered as key factors and were assigned higher weights to reflect the greater importance in evaluating the candidate sites. Seven factors were assigned as primary factors with intermediate weight. The remaining four factors were considered secondary factors with lower weight. The details of each evaluation factor of this category are discussed in this section.

Key factors

The eight key factors for engineering include: construction access, vehicle access improvement, existing system connections, tunnel depth, connecting pipeline, tunneling

distance, power, and site groundwater and surface water pretreatment and disposal. These are described as follows:

Construction Access (Key Factor ENG-1)

This factor was evaluated with the question, “What is the ease of access (type and distance) to the freeway from the site and are alternative access routes available for construction?”

Access to the candidate site is important since a large number of trucks with heavy equipment and construction materials is expected to travel to and from the site during construction activities. High truck traffic flow would have significant impact on the regional arterial roads and local streets. Also, narrow and inadequate access roads can delay traffic movement and hence affect the construction at the portal sites.

A qualitative scale based upon the relative difficulty of entering and exiting the candidate site was used to evaluate this factor. The factor was evaluated using the following scale:

High: Two lane and greater than three miles to freeway or through private property or residential neighborhood with narrow streets and only one access route available.

Medium: Two lane and less than three miles to freeway or four lane and greater than three miles to freeway and access from one direction only.

Low: Four lane or larger, and less than three miles to freeway and more than one access route available and access from both directions.

Vehicle Access Improvement (Key Factor ENG-2)

This factor was evaluated with the question, “What improvements would be needed for access to the site?”

This question addressed the degree of improvements that would be required to provide adequate access for the truck with heavy equipment and construction materials into the candidate sites. Sites with inadequate or no access may require construction of new access roadways, which may require additional easements and would involve significant construction cost.

A qualitative scale based upon the relative degree of access improvement required for vehicle access during construction and operational activities at the portal sites was developed to evaluate this factor. The factor was evaluated using the following scale:

High: New access road needs to be constructed, difficult construction with high cost.

Medium: New access road needs to be constructed with lower construction cost or improvement on existing access way required.

Low: Existing access way is adequate with minor improvement.

No: No improvement required.

Existing System Connections (Key Factor ENG-3)

This factor was evaluated with the question, “What is the difficulty of connecting the existing conveyance system to the influent tunnel at the site?”

The existing conveyance system would be connected with the proposed influent tunnel at the portal sites. Depending on the location of the site, these connections can be complex and would require additional pipeline. This question assessed the candidate sites for their suitability to connect to the local conveyance system.

A qualitative scale based upon the relative difficulty of making existing piping connections to the tunnel was developed to evaluate this factor. The factor was evaluated using the following scale:

High: Connections difficult and complex.

Medium: Connections of average difficulty.

Low: Connections less complex than typical.

Tunnel depth (Key Factor ENG-4)

This factor was evaluated with the question, “How much deeper does the tunnel need to be relative to another candidate site within the portal siting area?”

This question addressed the relative cost and construction impacts associated with tunnel depth at the candidate portal sites. The deeper the tunnel is, the higher the cost and construction impact at the portal site. Site topography and presence of other utilities may also necessitate complex design and construction.

A quantitative scale based on the relative depth of tunnel at the candidate site was used to evaluate this factor.

Connecting Pipeline (Key Factor ENG-5)

This factor was evaluated with the question, “What is the length of connection pipeline required to divert flows to the influent tunnel?”

Depending on the location of the site, additional pipeline connection would be required to divert flows to the influent tunnel. The longer the length of the pipeline, the higher would be the cost and construction impacts. The factor was evaluated using a relative quantitative scale based on the length of the connection pipeline for each of the candidate sites.

Tunneling Distance (Key Factor ENG-6)

This factor was evaluated with the question, “Does the site lie in the preferred path of the tunnel alignment?”

The distance between the tunnel and the candidate site is important in terms of cost and number of private easements needed for the tunnel. The further the candidate site is from the tunnel centerline, typically the greater the cost and number of private easements needed.

A quantitative scale based on the length of the tunnel from the tunnel corridor to the portal site was used to evaluate this factor.

Power (Key Factor ENG-7)

This factor was evaluated with the question, “Does the local utility have adequate power service available on site?”

Construction and operation at the portal sites could require high electric power. Significant investment and cost are associated with any new power line or expansion of existing capacity. This question evaluated the candidate sites on the availability of required power at the portal sites for operation and construction activities.

The qualitative scale based upon relative cost to provide adequate electric power to the candidate site was developed to evaluate this factor. The factor was evaluated using the following scale:

High: None available, high cost to bring in.

Medium: Power is available but requires significant investment to upgrade to three-phase power at required voltage.

Low: Three-phase power is available at required voltage on-site.

No: significant investment required.

Site Ground/Surface Water Pretreatment and Disposal (Key Factor ENG-8)

This factor was evaluated with the question, “What is the degree of pretreatment and pipeline construction required to dispose dewatered groundwater at the portal site during construction activities?”

Construction of portals and tunnel near and below groundwater could require dewatering. Dewatered groundwater could be disposed into local sewer, storm drain or nearby surface water body according to state and local county or district regulations. Additional pretreatment may be required to meet the discharge requirements. In the absence of a suitable sewer line or storm drain on the site, additional pipelines may also be required which may have significant construction impacts. This question evaluated the candidate sites on the apparent ease and availability of disposal options at the sites during construction. The factor was evaluated using the following scale:

High: Major pipeline construction would likely be required.

Medium: Both storm drain and sanitary sewer are available and minor pipeline construction and/or pretreatment would likely be required.

Low: Storm drain, sanitary sewer and natural surface drainage all are available and adjacent to the site and minor pretreatment may be required.

Primary Factors

The seven primary factors in the engineering category were used to evaluate the candidate sites. They are described as follows.

Alternative Transport (Primary Factor ENG-1)

This factor was evaluated with the question, “Is there a potential for alternative means of transport to the site other than vehicular for construction?”

Availability of an alternative mode of transportation for heavy equipment and construction materials to the portal site would allow more flexibility and ease of construction activities. Based on number of alternative access modes adjacent to site (alternatives include rail and/or barge), the factor was evaluated using the following scale:

High: Neither rail nor barge.

Medium: Either rail or barge.

Low: Both rail and barge.

Connecting Structures (Primary Factor ENG-2)

This factor was evaluated with the question, “How many connecting structures (drop, diversion) are required to divert flows to the influent tunnel?”

Connecting structures are required to divert flows from the existing conveyance system to the influent tunnel. Depending on the site’s topographic features and existing local conveyance system near the candidate sites, connection from the portal to the influent tunnel can be complex and may require multiple connecting structures. The higher the number of connecting structures, the more complex the construction would be at the portal sites. This question assessed the candidate sites in terms of number of structures required to connect to the influent tunnel from the portal.

The factor was evaluated using a quantitative value based on number of structures required for connection to the influent tunnel.

Tunneling - Staging Flexibility (Primary Factor ENG-3)

This factor was evaluated with the question, “Does the size and shape of the site allow for flexibility of the site for various tunneling activities (working portal, retrieval portal)?”

Construction of the tunnels will require construction of both temporary and permanent structures at the portal sites. The extent of temporary structures at the portal sites will depend on whether or not the site is used for a working or receiving portal. The extent of permanent structures will depend largely on the site’s location (within a given alignment), but will also depend on the size of the site. A larger site of suitable shape would facilitate construction staging and would provide greater flexibility of construction and operational activities at the site. A larger site supports launching or retrieval of a tunnel boring machine as well as the full range of permanent facilities. This question assessed the candidate sites in terms of their relative suitability for allowing flexibility for various tunneling activities.

The factor was evaluated using the following scale:

High: Supports retrieval of tunnel boring machine only, and underground permanent facilities only.

Medium: Supports launching or retrieval of tunnel boring machine with some limits to contractor staging and permanent facilities.

Low: Supports launching or retrieval and permanent facilities with contractor flexibility for construction staging.

Tunneling - Settlement (Primary Factor ENG-4)

This factor was evaluated with the question, “What is the sensitivity of the surrounding site to settlement?”

Tunneling can induce varying degrees of settlement at the ground surface that can be potentially damaging to surface improvements. Tunnel depth and horizontal proximity to the tunnel centerline are important when determining the sensitivity of a site to settlement; however, the type of improvements present on the site is more often the critical factor. Undeveloped land or public space is not particularly sensitive to tunneling induced settlement because any movement is generally not damaging, or noticeable to the public. Public roadways and railroads are more sensitive to settlement because they can potentially be impacted; however, the magnitude of such impact and the mitigation or repair measures for these facilities are understood and the costs are relatively straightforward to estimate. Residential and commercial structures are typically the most sensitive to tunneling-induced settlement due to the difficulty in estimating the extents of potential damage, the difficulty in estimating potential mitigation costs, and the negative public perception.

The factor was evaluated using the following scale:

Scale: Based upon type of land use adjacent to portal siting area in 'Direction of Tunnel'

High: Residential and commercial development

Medium: Washington State Department of Transportation or railroad-type corridor

Low: Public space / undeveloped land

Use of Existing Structures (Primary Factor ENG-5)

This factor was evaluated with the question, “To what extent can existing structures on the site be used for construction?”

Construction of the tunnels will require that facilities be in-place at each working portal to support the work. These facilities include offices for both contractor and construction management staff, crew showers/changing buildings, equipment supply sheds, and a repair shop (most often covered). A site with a high density of existing structures that would not serve any of these functions will require extensive demolition followed by new temporary construction in order to prepare the site for construction activities. Conversely, a site with existing structures in favorable locations, or no structures at all, could reduce the amount of site preparation required. Based on relative use of existing structures on the site, the factor was evaluated using the following scale:

High: Structures exist which must be removed

Medium: Temporary structures will be required for site work

Low: Site has existing structures, which can be used for construction

Use of Existing King County Facilities (Primary Factor ENG-6)

This factor was evaluated with the question, “Does the location of the site support the use of existing King County facilities?”

Depending on the location of the sites, existing King County facilities could be used during construction and operation at the portals. This factor assessed the candidate sites for the opportunity to use existing King County facilities during construction and operation at the portal sites. The factor was evaluated using the following scale:

Scale: Based on relative use of existing King County facilities

High: No potential for use.

Medium: Site allows some reuse of existing King County facilities.

Low: Site allows extensive reuse of existing King County facilities.

Civil Site Work (Primary Factor ENG-7)

This factor was evaluated with the question, “To what degree is site alteration required to accommodate the construction?”

Some civil work may be required to prepare the site for construction of the portal. A site with undulating topography may require major civil site work, which would add cost and significant construction impacts. This factor was evaluated using a relative degree of civil site work required to accommodate the construction of portals at the site. The following scale was used to evaluate this factor:

Scale: Qualitative scale based on amount of site alteration required.

High: Significant alteration, major earthwork to remove hillside, and retaining wall construction required.

Medium: Moderate earthwork required to create level construction area.

Low: Little or no alteration required.

Secondary Factors

Four factors were classified as secondary and these are discussed as follows:

Maintenance Access (Secondary Factor ENG-1)

This factor was evaluated with the question, “What is the ease of access to the facility for maintenance?”

Access to the candidate site from the nearest major roadway is important for both truck traffic entering and leaving the site during construction and long-term operation for any permanent facilities.

A qualitative scale based upon the relative difficulty of entering and exiting the candidate site was used to evaluate this factor. The factor was evaluated using the following scale:

Scale: Based upon the relative difficulty of entering and exiting the portal site.

High: Access through private property or residential neighborhood with narrow streets.

Medium: Access from one direction only.

Low: Access from both directions.

Flooding (Secondary Factor ENG-2)

This factor was evaluated with the question, “Would the site be located in an area with a known flooding problem?”

Flooding potential can impact the facility long-term in addition to during construction. Areas with flooding potential may require specialized construction procedures for stormwater control and design. Available topographic and flood maps and aerial photographs were used to rate this factor. The factor was evaluated using the following scale:

High: Located in designated flood-problem area.

No: Not located in flood-problem area.

Unknown: Insufficient information available.

Geohazard (Secondary Factor ENG-3)

This factor was evaluated with the question, “What is the degree of geohazard potential (landslide, soil liquefaction) on the site?”

Land areas with steep slopes or areas of high landslide potential would require substantial site preparation including excavation and retaining walls to stabilize shoring and foundations and long-term maintenance to protect permanent facilities from landslide hazard. Steep slopes can also complicate construction traffic access.

The scale for determining the extent of geohazard was based on the area of the site subject to soil liquefaction potential or landslide potential. Available topographic and landslide maps and aerial photographs were used to rate this factor. The factor was rated using the following scale:

Scale: Based on amount of area subject to landslide potential or soil liquefaction.

High: More than 30 percent of the site has landslide potential and/or has moderate to deep liquefiable soils.

Medium: Less than 30 percent of the site has landslide potential and/or has moderate to deep liquefiable soils.

Low: None of the site has moderate to deep liquefiable soils.

Utilities (Secondary Factor ENG-4)

This factor was evaluated with the question, “Are there utilities available (sewer, telephone, water) on or adjacent to the site?”

Availability of utilities such as sewer, telephone, and water supply is essential for construction and operation at the portal sites. To add these utilities or extend from the adjacent sites in case of unavailability at the candidate sites may require significant cost. The factor was evaluated using the following qualitative scale:

High: None available, high cost to bring in.

Medium: Some utilities are available on or adjacent to the site.

Low: All utilities are available on or adjacent to the site.

Outfall Factors

The outfall category is comprised of nine factors that focused on construction issues and impacts to the environment and tribal fisheries. Four factors were considered key factors and were assigned higher weights to reflect the greater importance in evaluating the candidate sites. Three factors were assigned primary factors with intermediate weight. The remaining two factors were considered secondary factors with a lower weight. The details of each evaluation factor of the outfall category are discussed in this section.

Key factors

The four key factors for the outfall include: onshore construction, construction method feasibility, and eelgrass habitat disturbance for both tunnel and trench construction. These key factors are described as follows:

Onshore Construction (Key Factor Out-1)

This factor was evaluated with the question, “What is the relative complexity of construction from the portal location to the waterline along the proposed outfall alignment?”

Access to the shoreline is important since construction machinery, equipment, and materials must travel between the shoreline and the portal site during construction. Unfavorable or difficult access would increase the time and expense of onshore construction. Increased length or complexity of onshore construction due to railroad crossings and/or steep slopes would also increase time and expense of construction. Based on difficulty of construction access to the shoreline and onshore construction complexity (length, railroad crossings, and/or steep slopes), the factor was evaluated using the following scale:

High: Shoreline not directly accessible and more complex onshore construction.

Medium: Favorable shoreline access and more complex onshore construction.

Low: Favorable shoreline access and less complex onshore construction.

Construction Method Feasibility (Key Factor Out-2)

This factor was evaluated with the question, “Does the portal site location and its proposed alignment limit the flexibility to utilize multiple construction methods?”

The use of either tunnel or trench construction methods from the portal site locations may be limited by the length of the proposed outfall alignment (beyond standard range of construction method) or the presence of dense environmental resources such as eelgrass. The flexibility to utilize multiple construction methods along the proposed outfall alignment is desirable in order to avoid or minimize disturbance to environmental resources and potential areas of contaminated soil and/or groundwater. Based on the extent of limitations imposed on the use of construction methods by portal location and proposed alignment, the factor was evaluated using the following scale:

High: Portal location and nearshore environment limit both tunnel and trench construction methods.

Medium: Portal location and nearshore environment limit either tunnel or trench construction methods.

Low: Portal location and nearshore environments do not limit construction methods.

Eelgrass Habitat Disturbance – Tunnel Construction (Key Factor Out-3)

This factor was evaluated with the question, “To what extent would a tunnel alignment from this portal location disturb eelgrass habitat?”

Tunnel construction might require excavation of access shaft(s) along the proposed alignment to remove obstructions or repair tunneling equipment. The presence of eelgrass habitat along the outfall alignments from the proposed portal locations is considered a key constraint to portal siting because of the high resource value of eelgrass habitat and the extensive permitting and mitigation that would be required if eelgrass habitat were disturbed. Based on the extent of potential disturbance to eelgrass habitat, the factor was evaluated using the following scale:

High: High potential to disturb known eelgrass habitat.

Medium: Low potential to disturb known eelgrass habitat.

Low: No known eelgrass habitat along tunnel alignment

Eelgrass Habitat Disturbance – Trench Construction (Key Factor Out-4)

This factor was evaluated with the question, “To what extent would a trench alignment from this portal location disturb eelgrass habitat?”

Trench construction would require excavation of a surface trench and removal of eelgrass habitat along the proposed alignment. The presence of eelgrass habitat along the outfall alignments from the proposed portal locations is considered a key constraint to portal siting because of the high resource value of eelgrass habitat and the extensive permitting and mitigation that would be required if eelgrass habitat was disturbed. The factor is quantified

based on the anticipated area of eelgrass habitat disturbance in square feet. The factor was evaluated using the following scale:

This factor is evaluated quantitatively in terms of the anticipated area of eelgrass disturbance in square feet rather than using a high, medium, or low designation.

Primary Factors

Three primary factors in the outfall category were used to evaluate the candidate sites.

Nearshore Construction (Primary Factor Out-1)

This factor was evaluated with the question, “What is the pipeline length from the shoreline to a water depth of –80 feet mean lower low water (MLLW) along the proposed outfall alignment?”

The length of outfall construction in the nearshore has a direct impact on cost and duration of construction. Environmental resources and habitat areas are concentrated in the nearshore. The extent of potential environmental impacts and the required mitigation for nearshore construction would increase as length of construction within the nearshore increases. The factor was quantified based on the pipeline segment length, in feet, from the shoreline at MLLW to the –80 foot depth contour. The factor was evaluated using the following scale:

High: > 1,500 feet

Medium: 500 to 1,500 feet

Low: < 500 feet

Tribal Fisheries (Primary Factor Out-2)

This factor was evaluated with the question, “Are tribal fisheries present along the proposed outfall alignment from this portal location?”

Established fisheries are an important tribal resource. The physical presence of the outfall pipeline could snag, damage, or impair the use of fishing gear. The factor was evaluated using the following scale:

Scale: Based on presence and proximity of tribal fisheries along proposed outfall alignment.

High: Known concentrated area of active fishery within 1,000 feet of proposed outfall alignment.

Medium: Known area of active fishery near outfall zone.

Low: No known active fishery.

Tribal Spot Prawn Areas (Primary Factor Out-3)

This factor was evaluated with the question, “Are tribal spot prawn fisheries present along proposed outfall alignment from this portal location?”

Established spot prawn areas are an important tribal resource. The physical presence of the outfall pipeline could impair spot prawn harvesting. Location of the outfall pipeline on the

seafloor could displace preferred harvesting areas. The factor was evaluated using the following scale:

Scale: Based on presence and proximity of tribal spot prawn area along proposed outfall alignment.

High: Known spot prawn area within 1,000 feet of proposed outfall alignment.

Medium: Known spot prawn area near outfall zone.

Low: No known spot prawn area.

Secondary Factors

Two secondary factors in the outfall category were used to evaluate the candidate sites and are discussed as follows:

Forage Fish Habitat Disturbance – Tunnel Construction (Secondary Factor Out-1)

This factor was evaluated with the question, “To what extent would a tunnel alignment from this portal location disturb forage fish spawning habitat?”

Tunnel construction would require excavation of access shaft(s) along the proposed alignment to remove obstructions or repair tunneling equipment. The presence of forage fish spawning habitat along the outfall alignments from the proposed portal locations is considered a secondary constraint to portal siting due to the potential permitting and mitigation that may be required if forage fish spawning habitat was disturbed.

Known/suspected forage fish spawning habitat areas are ubiquitous along the shoreline in the vicinity of the potential portal sites. The factor was evaluated using the following scale:

Scale: Based on extent of potential disturbance to forage fish spawning habitat.

High: High potential to disturb known/suspected forage fish spawning habitat.

Medium: Low potential to disturb known/suspected forage fish spawning habitat.

Low: No known forage fish-spawning habitat along tunnel alignment.

Forage Fish Habitat Disturbance – Trench Construction (Secondary Factor Out-2)

This factor was evaluated with the question, “To what extent would a trench alignment from this portal location disturb forage fish spawning habitat?”

Trench construction would require excavation of a surface trench and removal of forage fish spawning habitat along the proposed alignment. The presence of forage fish spawning habitat along the outfall alignments from the proposed portal locations is considered a secondary constraint to portal siting due to the potential permitting and mitigation that may be required if forage fish spawning habitat was disturbed. Known/suspected forage fish spawning habitat areas are ubiquitous along the shoreline in the vicinity of the potential portal sites. The factor was evaluated using the following scale:

Scale: Based on extent of potential disturbance to forage fish spawning habitat.

High: High potential to disturb known/suspected forage fish spawning habitat.

Medium: Low potential to disturb known/suspected forage fish spawning habitat.

Low: No known forage fish-spawning habitat along trench alignment.

Community and Environment Factors

The Community and Environmental category is comprised of 22 evaluation factors that focus on construction issues and impacts to community and environment. Nine factors were considered key factors and were assigned higher weights to reflect the greater importance in evaluating the candidate sites. Four factors were assigned as primary factors with intermediate weight. The remaining nine factors were considered secondary factors with a lower weight. The details of each evaluation factor in this category are discussed in this section.

Key Factors

The nine key factors of community and environment category are described as follows:

Endangered Species Act Compliance (terrestrial) – Conveyance (Key Factor ENVR – 1)

This factor was evaluated with the question, “Would construction of the portal disrupt or cross habitat areas that support terrestrial wildlife species listed as threatened / endangered / candidate / or state species of concern?”

The presence of special status species or their habitat on a candidate site was seen as a potential constraint as it may lead to impacts on sensitive environmental resources. The presence of special status species or their habitat could also result in significant permitting and mitigation requirements for the project.

Federal, state and local regulations require avoidance of these resources as a top priority; therefore, it was considered one of the key factors for the candidate site evaluation process. The presence of special status species was determined from surveys published by fish and wildlife agencies. Project biologists who made field observations of each of the candidate sites from public rights-of-way identified habitat for special status species. Based on this information, each candidate site was given a qualitative high, low, or no answer regarding the potential for temporary or permanent impacts to special status species or their habitat. The factor was evaluated using the following scale:

High: Documented presence of special status species or their suitable habitat on the site or up to 0.25 mile from the site.

Medium: Documented presence of special status species or their suitable habitat between 0.25 mile and 0.5 mile from the site.

Low: Documented presence of special status species or their suitable habitat 0.5 mile or more from the site.

No: Lack of documented special status species or suitable habitat 1 mile or more from the site

Endangered Species Act Compliance (aquatic) – Conveyance (Key Factor ENVR – 2)

This factor was evaluated with the question, “Would construction of the portal disrupt or cross habitat areas that support aquatic species listed as threatened/endangered/candidate/ or state species of concern?”

Various sensitive aquatic species (such as Puget Sound chinook salmon and bull trout) are legally protected in accordance with the Endangered Species Act and/or the Washington Administrative Code. The construction of candidate portal sites has potential to adversely affect fresh water habitat for sensitive aquatic species. This evaluation factor considered the proximity of construction and potential for impact to habitat that are documented as supporting or have high potential of supporting sensitive aquatic species. The factor was evaluated using the following scale:

High: It is likely that the construction at the portal site would generate impacts onsite to a stream/buffer or convey impacts downstream to habitats that support listed fish species.

Low: It is unlikely that the construction of the portal would generate impacts onsite to a stream/buffer or convey impacts downstream to habitats that support listed fish species.

No: The construction of the portal would not generate impacts onsite to a stream/buffer or convey impacts downstream to habitats that support listed fish species.

Wetlands (Key Factor ENVR - 3)

This factor was evaluated with the question, “Would construction of the portal affect wetlands or their buffers?”

Avoidance of wetlands (CORPS has concerns re: all wetlands) is a key consideration for federal, state, and local permitting agencies. The presence of wetlands is considered a substantial constraint to portal siting because of their resource value and extensive permitting, buffering, and mitigation requirements.

The scale for determining the presence of high-quality wetlands was based on review of available mapped wetland areas with limited site-specific evaluation. This key factor was evaluated based on the potential temporary or permanent impact to wetlands or their associated buffers within the candidate site.

High: The portal site construction would impact a Class 1 or 2 wetland or adjacent buffer.

Medium: The portal site construction would impact a Class 3 or 4 wetland.

Low: The portal would impact a Class 3 or 4 wetland buffer.

No: The portal would not impact a buffer or have an impact on wetlands or buffers.

Stream Impacts (Key Factor ENVR - 4)

This factor was evaluated with the question, “Would the construction of portals disrupt streams or their buffers?”

The question evaluated the potential to affect natural surface waters or their buffers. Direct impacts to surface water could reduce existing and long-term fish and/or wildlife habitat. Activities at the candidate site can substantially impact adjacent streams and, therefore, it is considered one of the key factors in the portal site selection process.

The evaluation was based on the potential of temporary or permanent impacts to streams, lakes, Puget Sound, and/or associated buffers or shoreline zones. Temporary or permanent impacts could include loss of vegetation, discharge or dewatering water, lower water levels due to nearby dewatering, land erosion, site erosion, and transport of sediment to surface water, etc. The following scale was used to evaluate this factor:

High: It is likely that the construction at the portal site would impact a stream or its buffer.

Low: It is unlikely that the construction of the portal would impact a stream or its buffer.

No: The construction of the portal would not impact a stream or its buffer.

Natural Environment (Key Factor ENVR - 5)

This factor was evaluated with the question, “Would the construction of portals permanently affect wetlands, streams, and/or their buffers, high quality upland habitat, or habitat for special status species?”

This factor is important because it evaluates the cumulative impact to regulated sensitive habitats including wetlands, streams, buffers, and habitat that supports sensitive species. The evaluation is based on a quantitative estimate of area of permanent effects on regulated resources and their buffers or high quality upland habitat. The factor was evaluated using the following scale:

High: Greater than 0.2-acre impact.

Medium: Between 0.1 and 0.2-acre impact.

Low: Less than 0.1-acre impact.

No: No permanent impact.

Traffic Disruption – Truck Haul Routes (Key Factor ENVR - 6)

This factor was evaluated with the question, “To what extent would the truck haul routes utilize residential streets?”

Traffic disruption is a frequently stated concern of residents. The question was aimed at assessing the potential impacts on local traffic during construction at the candidate site. The following scale was used for determining traffic disruption:

High: Uses significant amount of residential streets.

Medium: Uses arterials with only minor use of residential streets.

Low: No residential streets utilized.

Noise (Key Factor ENVR - 7)

This factor was evaluated with the question, “How discernible would construction noise be in the vicinity of the portal site?”

Noise due to construction could be a disruption to neighboring properties. The same noise emitted from a parcel where existing background noise is already significant would likely be less noticeable/disturbing than the same noise propagated from a parcel with low existing background noise. The factor was evaluated using the following scale:

High: Low existing ambient noise.

Medium: Moderate existing ambient noise.

Low: High existing ambient noise.

Land Use (Key Factor ENVR - 8)

This factor was evaluated with the question, “Would there be potential for public shared uses of the portal site after construction?”

Shared use can be a benefit to the community, especially in situations where existing public land or the potential for shared public use is limited. The factor was evaluated using the following scale:

Scale: Yes or No?

Dewatering (Key Factor ENVR - 9)

This factor was evaluated with the question, “Would dewatering discharge at the portal site result in impacts to water bodies (e.g., wetlands, streams, lakes)?”

Discharging to the natural water bodies adjacent to the portal site is one of the potential options for disposing dewatered groundwater generated during construction activities at the portal sites. Discharge may impact the nearby water bodies if it is classified as sensitive to high flow rate or discharge quality. The factor was evaluated using the following scale:

Scale: Qualitative Assessment: High, Medium, or Low

Primary Factors

Archeological and Cultural Resources (Primary Factor ENVR-1)

This factor was evaluated with the question, “Are archeological/cultural resources likely to be present at portal site?”

This question addressed the likelihood of documented or known archeological or historical resources to be present within the candidate site. It is preferable to avoid the presence of

archeological or historical resources on the site because of their inherent value. Significant construction delays could occur if cultural resources are disturbed.

The qualitative scale based on review of available information and discussions with tribal or other cultural/historic experts was as follows:

Scale: Archeological/cultural resources present at proposed portal site.

High: Archeological/cultural resources likely.

Medium: Archeological/cultural resources possible.

Low: Archeological/cultural resources unlikely.

High-Quality Upland Habitat (Primary Factor ENVR – 2)

This factor was evaluated with the question, “Would construction of the portal affect high-quality upland habitat?”

High-quality upland habitat is defined as mature forest in natural condition. The presence of high-quality upland habitat on a candidate site was seen as a potential constraint as it may lead to impacts on sensitive environmental resources.

The question was developed to determine whether any high-quality upland habitat would be affected by the construction of the portal. Assessment was performed using the following scale:

Yes: Construction of the portal is likely to displace high-quality upland habitat areas.

No: Construction of the portal would not displace high-quality upland habitat areas.

Traffic Disruption - Duration Period (Primary Factor ENVR-3)

This factor was evaluated with the question, “What would be the duration of disruption due to construction at the portal?”

The question was aimed at assessing the potential impacts on local traffic during construction at the candidate site. Traffic disruption is a frequently-stated concern of residents. The factor was evaluated using the following scale:

High: Construction of portal would require long-term (construction period) detours or blocked local access.

Medium: Construction of portal would result in short-term (a few days) detours or blocked access.

Low: Construction of portal would not require detours or blocked access.

Bicycle/Pedestrian (Primary Factor ENVR-4)

This factor was evaluated with the question, “Is there regular bicycle or pedestrian traffic near this site because of an established trail or commute route?”

The presence of pedestrian and/or bicycle traffic can have overall safety implications as well as the potential for impacts to individual recreation and transportation needs. The factor was evaluated using the following scale:

High: Frequent bicycle and pedestrian traffic.

Medium: Low or infrequent levels of bicycle and pedestrian traffic, or easily detoured or redirected.

Low: No elevated levels of bicycle/pedestrian traffic.

Secondary Factors

Visual Resources – Construction (Secondary Factor ENVR-1)

This factor was evaluated with the question, “Would construction on the portal site cause visual impacts?”

Construction equipment and activities can be perceived by some to be scars on the landscape. The factor was evaluated using the following scale:

High: Site in highly visible location; minimal opportunities for screening or visual enhancement.

Medium: Site in highly visible location; opportunities available for screening or visual enhancement.

No: Site not located in highly visible location.

Visual Resources – Permanent Facilities (Secondary Factor ENVR-2)

This factor was evaluated with the question, “Would permanent facilities at the portal site cause visual impacts?”

Man-made structures can be perceived by some to be scars on the landscape. The factor was evaluated using the following scale:

High: Site in highly visible location; minimal opportunities for screening or visual enhancement.

Medium: Site in highly visible location; opportunities available for screening or visual enhancement.

Low: Site not located in highly visible location.

Visual Resources – Night Light Glare (Secondary Factor ENVR-3)

This factor was evaluated with the question, “Would construction be in line-of-sight (night light glare)?”

Light pollution can be perceived by some observers as a nuisance. The factor was evaluated using the following scale:

Scale: Qualitative scale based on neighboring facilities.

High: Residence in line-of-sight.

Medium: Business (day use only) in line-of-sight.

Low: Nothing in line-of-sight.

Air Quality (Secondary Factor ENVR-4)

This factor was evaluated with the question, “Would construction at the portal impact the air quality of receptors?”

Construction activities have the potential to result in air pollution in the form of dust or construction vehicle emissions. The degree of impact was assumed to be directly proportional to the distance of receptors from the site. The factor was evaluated using the following scale:

High: Receptors immediately adjacent to portal site, impacts possible.

Medium: Receptors more than 500 feet from portal site, impacts not likely.

Low: No receptors in immediate vicinity of portal site, no impacts anticipated.

Air Quality (Secondary Factor ENVR-5)

This factor was evaluated with the question, “Would operation of the facilities at the portal impact the air quality of receptors?”

The potential for air quality impacts to neighboring properties during operation would depend on the permanent facilities to be located at the portal site. Regardless, the degree of impact was assumed to be directly proportional to the distance of receptors from the site. The factor was evaluated using the following scale:

High: Receptors immediately adjacent to portal site, impacts possible.

Medium: Receptors more than 500 feet from portal site, impacts not likely.

Low: No receptors in immediate vicinity of portal site, no impacts anticipated.

Landmarks (Secondary Factor ENVR-6)

This factor was evaluated with the question, “Would any officially-designated local landmark (building, object, or structure) be impacted by construction or the completed portal?”

The factor was evaluated using the following scale:

High: A local officially- designated landmark would be permanently impacted during construction or by the completed project.

Medium: A local officially- designated landmark would be temporarily impacted during construction - there would be no impact by the completed portal.

Low/No: There would be no impacts either by construction or the completed portal.

Land Use (Secondary Factor ENVR-7)

This factor was evaluated with the question, “Would the use of the site after construction be the same as the existing use?”

This factor simply answered the question of whether or not the land use would change as a result of the proposed facilities. The factor was evaluated using the following scale:

Scale: Yes or No?

Dewatering (Secondary Factor ENVR-8)

This factor was evaluated with the question, “Is there a receiving water (e.g., wetland, stream, lake) in sufficient proximity to the portal site to receive dewatering water, if the dewatering water cannot all be discharged to a storm or sanitary sewer?”

Direct discharge to the surface water bodies adjacent to the candidate site is another alternative to disposal of dewatered groundwater. This question addressed the availability of natural surface water bodies adjacent to the candidate site. The factor was evaluated using the following scale:

Scale: Yes or No?

Contamination (Secondary Factor ENVR-9)

This factor was evaluated with the question, “What would be the potential for encountering contaminated soils and/or groundwater?”

The presence of contamination on the portal site could complicate the construction of the proposed facilities and have the potential to significantly increase the costs of construction. The factor was evaluated using the following scale:

High: The site has historical or current uses that could contribute to soil/groundwater contamination.

Medium: Parcels in the vicinity of the land have historical or current uses that could contribute to soil/groundwater contamination of the subject property.

Low: Known/documented contamination not on or immediately adjacent to portal site.

Permitting

The Permitting category was comprised of two factors, both of which were considered to be secondary in terms of importance.

Secondary Factors

Land Use (Secondary Factor PER-1)

This factor was evaluated with the question: “Would the project facilities on the portal site be allowed under the existing development regulations?”

Compatibility with existing development regulations can be an indicator of the complexity of the permitting process, and can thus potentially affect both schedule and cost. The factor was evaluated using the following scale:

Scale: Yes or No?

Land Use (Secondary Factor PER-2)

This factor was evaluated with the question: “Would construction or operation require a shoreline permit?”

The need for a shoreline permit would add an additional permitting requirement. The factor was evaluated using the following scale:

Scale: Yes or No?

Land Acquisition and Jurisdictional Factors

The Land Acquisition and Jurisdictional category is comprised of ten evaluation factors that focused on issues related to land acquisition. Three factors were Key factors and were assigned higher weights to reflect the greater importance in evaluating the candidate sites. Four factors were assigned as Primary factors with intermediate weight. The remaining three factors were Secondary factors with the lowest weight. The details of each evaluation factor within the Land Acquisition and Jurisdictional category are discussed in this sub-section.

Key Factors

Legal Restrictions on Title (Key Factor LAND-1)

This factor was evaluated with the question: “Are there existing legal restrictions to title in the portal acquisition site which would prevent or limit planned construction?”

It is important that any legal restriction on title be identified and addressed in the evaluation process since it can pose significant delay in the acquisition of the sites. The question was asked to assess any restriction on title that would affect construction and operation at the candidate sites. The factor was evaluated using the following scale:

High: Title restrictions severely limit available useable land area and are difficult or impossible to remove.

Medium: Some title restrictions exist but can be removed with some effort or project can be adapted to accommodate.

Low: Title restrictions do not limit available useable land.

Required Surface Easements (Key Factor LAND-2)

This factor was evaluated with the question, “What is the estimate of private subsurface property interests (not in public right-of-way) that must be acquired to join subject portal site to the proposed conveyance corridor?”

Acquisition of surface easements can require an effort and have an effect on use similar to the acquisition of fee title. The analysis of this cost and complexity is important in a siting decision. The factor was evaluated using the following scale:

Scale: Quantitative number of easement properties.

Adjacent Subsurface Easements (Key Factor LAND-3)

This factor was evaluated with the question, “What is the estimate of private subsurface property interests (not in public right-of-way) that must be acquired to join subject portal site to the proposed conveyance corridor?”

Subsurface easements near portal sites are expected to have a smaller effect on use of property than the acquisition of surface easements or fee title; however, acquisition may take the same amount of time and complex issues may arise. An assessment of the cost and complexity is an important element of the siting decision. The factor was evaluated using the following scale:

Scale: Quantitative number of easement properties.

Primary Factors

Relative Number of Acquisition Parcels (Primary Factor LAND-1)

This factor was evaluated with the question, “What is the estimated total number of private property acquisitions in the portal site?”

The evaluation question was designed to address the issues related to time and complexity associated with potential acquisition of property rights for candidate sites. Higher numbers of parcels may be considered a constraint. The evaluation was based on the number of parcels within the candidate site. The factor was evaluated using the following scale:

Scale: Quantitative number of easement properties.

Complexity of Relocations - Conveyance (Primary Factor LAND-2)

This factor was evaluated with the question, “How difficult and time-consuming will it be for occupants in the portal site areas to relocate?”

This is aimed at determining the degree of complexity for relocating the occupants in the candidate sites. Assessment was based on the type and intensity of land use at the candidate site. The factor was evaluated using the following scale:

High: Relocations include unique businesses with unique site requirements.

Medium: Relocations are likely to be complex and disruptive, but occupants appear to be reasonably able to relocate.

Low: Relative level of complexity in occupant relocations appears to be low.

Residential Construction Disruption - Permanent (Primary Factor LAND-3)

This factor was evaluated with the question, “What is the permanent construction disruption on residential property uses adjacent to portal site areas?”

The assessment of permanent construction disruption on residential property uses adjacent to portal site areas looks at the type and extent of projected permanent change due to the portal placement and is therefore an important factor in the siting process.

This question was developed to evaluate the impact of the construction at the candidate site to the adjacent residential land use. The factor was evaluated using the following scale:

High: Appear to have the highest levels of permanent residential disruption in potential portal areas.

Medium: Appear to have mid-level impacts of permanent residential disruption in potential portal areas.

Low: Appear to have the lowest levels of permanent residential disruption in potential portal areas.

Commercial Construction Disruption - Permanent (Primary Factor LAND-4)

This factor was evaluated with the question, “What is the permanent construction disruption on commercial property uses adjacent to portal site areas?”

The assessment of permanent construction disruption on commercial property uses adjacent to portal site areas looks at the type and extent of projected permanent change due to the portal placement and is therefore an important factor in the siting process. This question was developed to evaluate the impact of the construction at the candidate site to the adjacent residential land use. The factor was evaluated using the following scale:

High: Appear to have the highest levels of permanent commercial disruption in potential portal areas.

Medium: Appear to have mid-level impacts of permanent residential disruption in potential portal areas.

Low: Appear to have the lowest levels of permanent residential disruption in potential portal areas.

Secondary Factors

Relative Level of Property Development (Secondary Factor LAND-1)

This factor was evaluated with the question, “What is the relative level of development and known permitted development on the portal site?”

The factor was designed to assess the relative time, complexity and disruption associated with development density on the candidate site. It is assumed that higher development density would result in more complicated acquisitions and relocations and therefore would require more time and resources. The factor was evaluated using the following scale:

High: Highest existing structures.

Middle: Middle permitted and masterplans, level of development.

Low: Lowest – unimproved property or lowest level of improvements.

Residential Construction Disruption - Temporary (Secondary Factor LAND-2)

This factor was evaluated with the question, “What is the temporary construction disruption on residential property uses adjacent to portal site areas?”

Temporary construction disruption on residential property uses adjacent to portal site areas is a consequence that King County is seeking to minimize or buffer and is therefore an important factor to evaluate in the siting process. This question addressed one of the constraints imposed by the construction at the candidate site to the adjacent residential land use. The factor was evaluated using the following scale:

High: Appear to have the highest levels of temporary residential disruption in potential portal areas.

Medium: Appear to have mid-level impacts of temporary residential disruption in potential portal areas.

Low: Appear to have the lowest levels of temporary residential disruption in potential portal areas.

Commercial Construction Disruption - Temporary (Secondary Factor LAND-3)

This factor was evaluated with the question, “What is the temporary construction disruption on commercial property uses adjacent to portal site areas?”

Temporary construction disruption on commercial property uses adjacent to portal site areas is a consequence that King County is seeking to minimize or buffer and is therefore an important factor to evaluate in the siting process. This question was designed to address the impacts of construction at the candidate site to the adjacent commercial land use. The factor was evaluated using the following scale:

High: Appear to have the highest levels of temporary commercial disruption in potential portal areas.

Medium: Appear to have mid-level impacts of temporary commercial disruption in potential portal areas.

Low: Appear to have the lowest levels of temporary commercial disruption in potential portal areas.

Financial Factors

Secondary Factors

Relative Cost of Site Acquisition and Relocation (Secondary Factor FIN-1)

This factor was evaluated with the question, “What is the estimated total relative cost of private property acquisitions and relocations in the portal site area?”

Responsibility to the ratepayers and best practices in project management require that financial aspects including the relative price of land acquisitions and relocations be considered as an important factor in comparing the candidate sites. The factor was evaluated using the following scale:

High: Highest cost.

Medium: Moderate cost.

Low: Lowest cost.

Mitigation Opportunities ***Secondary Factors***

Onsite Compensatory Natural Resource Mitigation Potential (Secondary Factor MIT-1)

This factor was evaluated with the question, “What is the level of acreage that exists to provide onsite compensatory natural resource mitigation for impacts in the portal site area?”

Onsite compensatory natural resource mitigation for impacts was considered to help mitigate local impacts resulting from the construction. Area for buffers and natural resource restoration or improvement opportunities were considered. The factor was evaluated using the following scale:

High: Relatively highest level of acreage exists to provide onsite natural resource mitigation for identified impacts.

Medium: Relatively medium level of acreage exists to provide onsite natural resource mitigation for identified impacts.

Low: Relatively low level of acreage exists to provide onsite natural resource mitigation for identified impacts.

Summary of Level 3 Portal Screening Results

The Level 3 portal screening included a review of engineering, environmental, community, finance, and land acquisition criteria and other data as well as input from local jurisdictions. Summary of the Portal 19 screening results is included in Appendix C. Based on the Level 3 screening process for proposed Portal 19, Site E19-C is the preferred location for proposed Portal 19.

For proposed Portal 19, Site E19-C is the preferred site because the proposed outfall alignments from the site would minimize or avoid potential disturbance to environmental resources, limit onshore and nearshore segment lengths, and provide favorable shoreline access. Additionally, Site E19-C is a large, relatively level area with flexibility for construction staging and minimum civil site work required. It also offers the shortest tunnel length. Site E19-C combines the outfall tunnel and portal area into one property and minimizes overall property needs.



Figure 1-A

Portal Siting Area 19 with Candidate Sites

**BRIGHTWATER REGIONAL
WASTEWATER TREATMENT SYSTEM**



King County
Department of
Natural Resources and Parks
**Wastewater Treatment
Division**

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Data Source: King County

File Name: dnrp1:\WTD\Projects\BW_FEIS\projects\portal_parcel.apr Shari Cross

Prepared by: King County WTD GIS

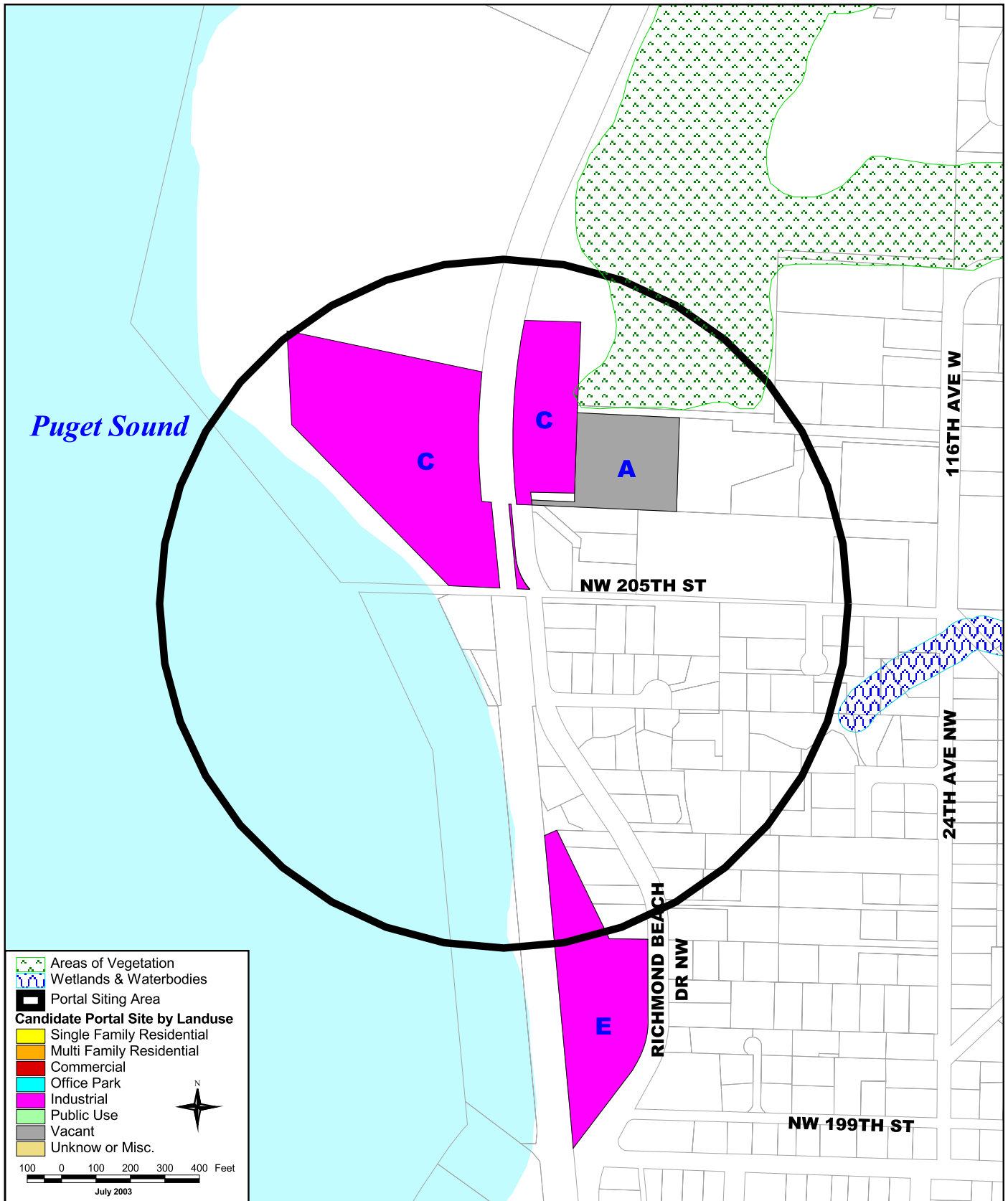


Figure 1-B

Portal Siting Area 19 with Candidate Sites

**BRIGHTWATER REGIONAL
WASTEWATER TREATMENT SYSTEM**



King County
Department of
Natural Resources and Parks
**Wastewater Treatment
Division**

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Prepared by: King County WTD GIS

Appendix A

Evaluation Factors used in Level 3 Screening Process
for Portal 19

Appendix A : Evaluation Factors Used in Level 3 Screening Process for Portal 19

Evaluation Factors Used in Level 3 Screening Process for Portal 19					
#	Factor Code	Key Word	Description	Relative Weight	Criteria Weight
ENGINEERING				Total	9.3%
1	KEY FACTOR ENG - 1	Construction Access	Determine the ease of access (type and distance) to the freeway from the site and availability of alternative access routes for construction	3	0.66%
2	KEY FACTOR ENG - 2	Vehicle Access Improvement	Determine the relative improvements needed to provide access to the site	3	0.66%
3	PRIMARY FACTOR ENG-1	Alternative Transport	Assess the potential for alternative means of transport to the site other than vehicular for construction	2	0.44%
4	SECONDARY FACTOR ENG-1	Maintenance Access	Assess the degree of ease of access to the facility for maintenance	1	0.22%
5	KEY FACTOR ENG - 3	Existing System Connections	Assess the degree of difficulty for connecting the existing conveyance system to the influent tunnel at the site	3	0.66%
6A	PRIMARY FACTOR ENG-2	Connecting Structures	Estimate the number of connecting structures (drop, diversion) are required to divert flows to the influent tunnel	2	0.44%
6B	KEY FACTOR ENG-5	Connecting Pipeline	Estimation of the length of connection pipeline required to divert flows to the influent tunnel	3	0.66%
7	KEY FACTOR ENG - 4	Tunnel Depth	Determines the relative depth of the tunnel need to be based on site selection relative to another candidate site within the portal selection area	3	0.66%
8	KEY FACTOR ENG-6	Tunneling Distance	Likelihood of the site to lie in the preferred path of the tunnel alignment	3	0.66%
9	PRIMARY FACTOR ENG-3	Tunneling - Staging Flexibility	Determine whether the size and shape of the site allow flexibility for various tunneling activities (launching portal, retrieval portal)	2	0.44%
10	PRIMARY FACTOR ENG-4	Tunneling - Settlement	Assess the sensitivity of the surrounding site to settlement	2	0.44%
11	PRIMARY FACTOR ENG-5	Use of Existing Structures	Determine the extent to which the existing structures on the site can be used for construction	2	0.44%
12	PRIMARY FACTOR ENG-6	Use of Existing King County Facilities	Determine the feasibility of using the existing King County facilities	2	0.44%
13	SECONDARY FACTOR ENG-2	Flooding	Determine whether the site is located in an area with a known flooding problem	1	0.22%
14	SECONDARY FACTOR ENG-3	Geohazard	Determine the degree of geohazard potential (landslide, soil liquefaction) on the site	1	0.22%
15	PRIMARY FACTOR ENG-7	Civil Site Work	Determine the degree of site alteration required to accommodate the construction	2	0.44%
16	KEY FACTOR ENG - 7	Power	Identify whether the local utility has adequate power service available onsite	3	0.66%
17	SECONDARY FACTOR ENG-4	Utilities	Identify the availability of the utilities (sewer, telephone, water) at the sites	1	0.22%
18	KEY FACTOR ENG - 8	Site Ground/Surface Water Pretreatment and Disposal	Determine the degree of pretreatment and pipeline construction required to dispose dewatered groundwater at the portal site during construction activities	3	0.66%
OUTFALL				Total	50.0%
19	KEY FACTOR OUT-1	Onshore Construction	Determine the relative complexity of construction from the portal location to the waterline along the proposed outfall alignment	3	7.50%
20	PRIMARY FACTOR OUT-1	Nearshore Construction	Estimate the pipeline segment length from the shoreline to a water depth of -80 feet MLLW along the proposed outfall alignment	2	5.00%
21	KEY FACTOR OUT-2	Construction Method Flexibility	Determine whether the portal site location and its proposed alignment limit the flexibility to utilize multiple construction methods	3	7.50%
22	SECONDARY FACTOR OUT-1	Forage Fish Habitat Disturbance - Tunnel Construction	Determine the extent to which the tunnel alignment from this portal location disturbs forage fish spawning habitat	1	2.50%

Evaluation Factors Used in Level 3 Screening Process for Portal 19					
#	Factor Code	Key Word	Description	Relative Weight	Criteria Weight
23	SECONDARY FACTOR OUT-2	Forage Fish Habitat Disturbance - Trench Construction	Determine the extent to which a trench alignment from this portal location disturbs forage fish spawning habitat	1	2.50%
24	KEY FACTOR OUT-3	Eelgrass Habitat Disturbance - Tunnel Construction	Determine the extent to which a tunnel alignment from this portal location disturbs eelgrass habitat	3	7.50%
25	KEY FACTOR OUT-4	Eelgrass Habitat Disturbance - Trench Construction	Determine the extent to which a trench alignment from this portal location disturbs eelgrass habitat	3	7.50%
26	PRIMARY FACTOR OUT-2	Tribal Fisheries	Determine whether the tribal fisheries are present along proposed outfall alignment from this portal location	2	5.00%
27	PRIMARY FACTOR OUT-3	Tribal Spot Prawn Areas	Determine whether tribal spot prawn fisheries are present along proposed outfall alignment from this portal location	2	5.00%
COMMUNITY-ENVIRONMENTAL				Total	29.8%
28	PRIMARY FACTOR ENVR-1	Archeological and Cultural Resources	Likely presence of archeological /cultural resources at portal site	2	1.35%
29	KEY FACTOR ENVR- 1	Endangered Species Act Compliance (terrestrial) – Conveyance	Likelihood of disruption to the habitat areas that support terrestrial wildlife species listed as threatened/endangered/candidate/ or state species of concern	3	2.03%
30	KEY FACTOR ENVR- 2	Endangered Species Act Compliance (aquatic) – Conveyance	Likelihood of disruption to habitat areas that support aquatic species listed as threatened/endangered/candidate/ or state species of concern	3	2.03%
31	PRIMARY FACTOR ENVR- 2	High Quality Upland Habitat	Determine the impacts to the high-quality upland habitat	2	1.35%
32	KEY FACTOR ENVR- 3	Wetlands	Determine the impacts to the wetlands or their buffers	3	2.03%
33	KEY FACTOR ENVR- 4	Stream Impacts	Determine impacts to the streams or their buffers	3	2.03%
34	KEY FACTOR ENVR- 5	Natural Environment	Determine whether the construction of portals would permanently affect wetlands, streams, and/or their buffers, high-quality upland habitat, or habitat for special status species	3	2.03%
35	KEY FACTOR ENVR- 6	Traffic Disruption - Truck Haul Routes	Determine the extent to which the truck haul routes utilize residential streets	3	2.03%
36	PRIMARY FACTOR ENVR-3	Traffic Disruption - Duration Period	Determine the duration of disruption due to construction at the portal	2	1.35%
37	PRIMARY FACTOR ENVR-4	Bicycle/Pedestrian	Identify whether there is any regular bicycle or pedestrian traffic near this site because of an established trail or commute route	2	1.35%
38	SECONDARY FACTOR ENVR-1	Visual Resources - Construction	Determine whether construction on the portal site would cause visual impacts	1	0.68%
39	SECONDARY FACTOR ENVR-2	Visual Resources - Permanent Facilities	Determine whether permanent facilities at the portal site would cause visual impacts	1	0.68%
40	SECONDARY FACTOR ENVR-3	Visual Resources - Night Light Glare	Determine whether construction would be in line-of-sight (night light glare)	1	0.68%
41	SECONDARY FACTOR ENVR-4	Air Quality - Construction	Determine whether construction at the portal would impact the air quality of receptors	1	0.68%
42	SECONDARY FACTOR ENVR-5	Air Quality - Operation of facilities	Determine whether operation of the facilities at the portal would impact the air quality of receptors	1	0.68%
43	KEY FACTOR ENVR-7	Noise	Determine the extent to which construction noise would be discernible in the vicinity of the portal site	3	2.03%
44	SECONDARY FACTOR ENVR-6	Landmarks	Determine whether any officially designated local landmark (building, object, or structure) would be impacted by construction or the completed portal	1	0.68%
45	KEY FACTOR ENVR-8	Land Use	Determine whether there would be potential for public shared uses of the portal site after construction	3	2.03%
46	SECONDARY FACTOR ENVR-7	Land Use	Determine whether the use of the site after construction would be the same as the existing use	1	0.68%
47	KEY FACTOR ENVR-9	Dewatering	Determine whether dewatering discharge at the portal site would result in impacts to water bodies (e.g., wetlands, streams, lakes)	3	2.03%

Evaluation Factors Used in Level 3 Screening Process for Portal 19					
#	Factor Code	Key Word	Description	Relative Weight	Criteria Weight
48	SECONDARY FACTOR ENVR-8	Dewatering	Identify whether there is a receiving water (e.g., wetland, stream, lake) in sufficient proximity to the portal site to receive dewatering water, if the dewatering water cannot all be discharged to a storm or sanitary sewer	1	0.68%
49	SECONDARY FACTOR ENVR-9	Contamination	Determine the likelihood of encountering contaminated soils and/or groundwater	1	0.68%
PERMITTING				Total	0.40%
50	SECONDARY FACTOR PER-1	Land Use	Determine whether the project facilities on the portal site would be allowed under the existing development regulations	1	0.20%
51	SECONDARY FACTOR PER-2	Land Use	Determine whether construction or operation would require a shoreline permit	1	0.20%
LAND ACQUISITION & JURISDICTIONAL				Total	9.8%
52	PRIMARY FACTOR LAND-1	Relative Number of Acquisition Parcels	Estimate the total number of private property acquisitions in the portal site	2	0.98%
53	SECONDARY FACTOR LAND-1	Relative Level of Property Development	Determine the relative level of development and known permitted development on the portal site	1	0.49%
54	KEY FACTOR LAND-1	Legal Restrictions on Title	Identify whether there are any existing legal restrictions to title in the portal acquisition site which would prevent or limit planned construction	3	1.46%
55	PRIMARY FACTOR LAND-2	Complexity of Relocations - Conveyance	Determine the extent to which it would be difficult and time-consuming for occupants in the portal site areas to relocate	2	0.98%
56	SECONDARY FACTOR LAND-2	Residential Construction Disruption - Temporary	Determine the relative magnitude of temporary construction disruption on residential property uses adjacent to portal site areas	1	0.49%
57	PRIMARY FACTOR LAND-3	Residential Construction Disruption - Permanent	Determine the relative magnitude of permanent construction disruption on residential property uses adjacent to portal site areas	2	0.98%
58	SECONDARY FACTOR LAND-3	Commercial Construction Disruption - Temporary	Determine the relative magnitude of temporary construction disruption on commercial property uses adjacent to portal site areas	1	0.49%
59	PRIMARY FACTOR LAND-4	Commercial Construction Disruption - Permanent	Determine the relative magnitude of permanent construction disruption on commercial property uses adjacent to portal site areas	2	0.98%
60	KEY FACTOR LAND-2	Required Surface Easements	Estimate the number of private surface property interests (not in public right-of-way) that must be acquired to improve proposed transportation connections to specific portal site	3	1.46%
61	KEY FACTOR LAND-3	Adjacent Subsurface Easements	Estimate the number of private subsurface property interests (not in public right-of-way) that must be acquired to join subject portal site to the proposed conveyance corridor	3	1.46%
FINANCIAL				Total	0.20%
62	SECONDARY FACTOR FIN-1	Relative Cost of Site Acquisition and Relocation	Estimated total relative cost of private property acquisitions and relocations in the portal site area		0.20%
MITIGATION OPPORTUNITIES				Total	0.20%
63	SECONDARY FACTOR MIT-1	Onsite Compensatory Natural Resource Mitigation Potential	Estimate the relative amount of land available outside of the facility footprint for on-site mitigation such as creation, restoration, and/or enhancement of uplands, wetlands, stream, and/or buffers		0.20%

Appendix B

Level 3 Screening Matrix for Portal 19

Level 3 Portal Screening Criteria
Final - August 2003

Notice:

King County has prepared a Draft Environmental Impact Statement (Draft EIS) on the Brightwater Regional Wastewater Treatment System. A Final Environmental Impact Statement (Final EIS) is scheduled for later in 2003. The Draft EIS and Final EIS are intended to provide decision-makers, regulatory agencies and the public with information regarding the probable significant adverse impacts of the Brightwater proposal and identify alternatives and reasonable mitigation measures.

The process followed by King County since adoption of the RWSP in late 1999 is outlined in Chapter 2 of the Draft EIS.

In consultation with Snohomish County and the cities within it, King County has applied adopted policy criteria to further define the general Brightwater Proposal called for in the Regional Wastewater Services Plan (RWSP). These criteria have been applied to potential sites for Brightwater facilities in Phases I and II of the siting process. Based upon this policy application, the County has refined its proposal and identified in the Draft EIS several alternative Brightwater systems, which could accomplish the County's overall Brightwater objective.

King County Executive Ron Sims has identified a preferred alternative, which is outlined in the Draft EIS.

This preferred alternative is for public information only, and is not intended in any way to prejudge the County's final decision, which will be made following the preparation of additional analyses, consideration of public input and comments on the Draft EIS and issuance of the Final EIS.

After issuance of the Final EIS, the King County Executive will select final locations for a treatment plant, marine outfall and associated conveyances.

In the interim, and in order to meet the requirement that the Brightwater project be operational in the year 2010, King County is proceeding with preliminary plans and designs and other work necessary to further refine the proposal and develop permit applications for the proposal.

This ongoing preliminary work will not limit the choice of reasonable alternatives to be selected at the end of the EIS process.

Note:

The Information used to apply these screening criteria is only that available as of this point in time. The ratings set forth below on specific portal sites do not take into account the specific mitigation measures which would be ultimately developed to further revise and eliminate a given impact. The portal site ratings below also do not take into account the extent to which the specific siting of Brightwater facilities within the portal sites could also reduce or eliminate the impact.

Brightwater Conveyance : Portal Site Screening Level 3 Evaluation Matrix - Portal 19									
#	Component	Screening Round	Code	Topic	Questions	Scale	Site A	Site C	Site E
ENGINEERING									
1	Portal Screening	FEIS	KEY FACTOR ENG - 1	Construction Access	What is the ease of access (type and distance) to the freeway from the site and are alternative access routes available for construction?	High: Two lane and greater than 3 miles to freeway or through private property or residential neighborhood with narrow streets and only one access route available. Medium: Two lane and less than 3 miles to freeway or four lane and greater than 3 miles to freeway and access from one direction only. Low: Four lane or larger, and less than 3 miles to freeway and more than one access route available and access from both directions	High	High	High
2	Portal Screening	FEIS	KEY FACTOR ENG - 2	Vehicle Access Improvement	What improvements would be needed for access to the site?	Scale : Based on required access road improvements. High: New access road needs to be constructed, difficult construction with high cost. Medium: New access road needs to be constructed with lower construction cost or improvement on existing access way required. Low: Existing access way is adequate with minor improvement. No: No improvement required.	High	Medium	Low
3	Portal Screening	FEIS	PRIMARY FACTOR ENG-1	Alternative Transport	Is there a potential for alternative means of transport to the site other than vehicular for construction?	Scale: Based on number of alternative access modes adjacent to site (alternatives include rail and/or barge). High: Neither rail nor barge. Medium: Either rail or barge. Low: Both rail and barge.	High	Low	High
4	Portal Screening	FEIS	SECONDARY FACTOR ENG-1	Maintenance Access	What is the ease of access to the facility for maintenance?	Scale: Based upon the relative difficulty of entering and exiting the portal site. High: Access through private property or residential neighborhood with narrow streets. Medium: Access from one direction only. Low: Access from both directions.	High	Medium	Medium
5	Portal Screening	FEIS	KEY FACTOR ENG - 3	Existing System Connections	What is the difficulty of connecting the existing conveyance system to the influent tunnel at the site?	Scale: Based upon the relative difficulty of making existing piping connections to the tunnel. High: Connections difficult and complex. Medium: Connections of average difficulty. Low: Connections less complex than typical.	NA	NA	NA
6A	Portal Screening	FEIS	PRIMARY FACTOR ENG-2	Connecting Structures	How many connecting structures (drop, diversion) are required to divert flows to the influent tunnel?	Scale: Quantitative value based on number of structures required for connection to the influent tunnel.	NA	NA	NA
6B	Portal Screening	FEIS	KEY FACTOR ENG-5	Connecting Pipeline	What is the length of connection pipeline required to divert flows to the influent tunnel?	Scale: Quantitative value based on length of connection pipeline.	NA	NA	NA
7	Portal Screening	FEIS	KEY FACTOR ENG - 4	Tunnel Depth	How much deeper does the tunnel need to be based on site selection relative to another candidate site within the portal selection area?	Scale: Quantitative value based on tunnel depth.	0	0	0
8	Portal Screening	FEIS	KEY FACTOR ENG - 6	Tunneling Distance	Does the site lie in the preferred path of the tunnel alignment?	Scale: Quantitative value based on the length of the tunnel from the tunnel corridor to the portal site.	300 ft	100 ft	1,200 ft
9	Portal Screening	FEIS	PRIMARY FACTOR ENG-3	Tunneling - Staging Flexibility	Does the size and shape of the site allow for flexibility of the site for various tunneling activities (launching portal, retrieval portal)?	High: Supports retrieval of tunnel boring machine only. Medium: Supports launching or retrieval of tunnel boring machine with some limits to contractor staging. Low: Supports launching or retrieval and permanent facilities with contractor flexibility for construction staging.	Medium	Low	Medium
10	Portal Screening	FEIS	PRIMARY FACTOR ENG-4	Tunneling - Settlement	What is the sensitivity of the surrounding site to settlement?	Scale: Based upon type of land use adjacent to portal siting area in 'Direction of Tunnel' High: Residential & commercial development Medium: WSDOT or railroad type corridor Low: Public space / undeveloped land	Low	Medium	Medium
11	Portal Screening	FEIS	PRIMARY FACTOR ENG-5	Use of Existing Structures	To what extent can existing structures on the site be used for construction?	Scale: Based on relative use of existing structures on the site High: Structures exist which must be removed Medium: Temporary structures will be required for site work Low: Site has existing structures which can be used for construction	Medium	Medium	Medium
12	Portal Screening	FEIS	PRIMARY FACTOR ENG-6	Use of Existing King County Facilities	Does the location of the site support the use of existing King County facilities?	Scale: Based on relative use of existing structure King County facilities High: No potential for use. Medium: Site allows some reuse of existing King County facilities. Low: Site allows extensive reuse of existing King County facilities.	High	High	High
13	Portal Screening	FEIS	SECONDARY FACTOR ENG-2	Flooding	Would the site be located in an area with a known flooding problem?	High: Located in designated flood-problem area. No: Not located in flood-problem area. Unknown: Insufficient information available.	No	No	No
14	Portal Screening	FEIS	SECONDARY FACTOR ENG-3	Geohazard	What is the degree of geohazard potential (landslide, soil liquefaction) of the site?	Scale: Based on amount of area subject to landslide potential or soil liquefaction. High: More than 30% of the site has landslide potential and/or has moderate to deep liquefiable soils. Medium: Less than 30% of the site has landslide potential and/or has moderate to deep liquefiable soils. Low: None of the site has moderate to deep liquefiable soils.	Medium	High	High

Level 3 Portal Screening Criteria
Final - August 2003

Brightwater Conveyance : Portal Site Screening Level 3 Evaluation Matrix - Portal 19									
#	Component	Screening Round	Code	Topic	Questions	Scale	Site A	Site C	Site E
15	Portal Screening	FEIS	PRIMARY FACTOR ENG-7	Civil Site Work	To what degree is site alteration required to accommodate the construction?	Scale: Qualitative scale based on amount of site alteration required High: Significant alteration, major earth work to remove hill side and retaining wall construction required. Medium: Moderate earthwork required to create level construction area. Low: Little or no alteration required.	High	Low	Medium
16	Portal Screening	FEIS	KEY FACTOR ENG - 7	Power	Does the local utility have adequate power service available on site?	Scale: Qualitative scale based on the availability of required power for operations and construction. High: None available, high cost to bring in. Medium: Power is available but requires significant investment to upgrade to three phase power at required voltage. Low: Three-phase power is available at required voltage on. No significant investment required.	Medium	Low	Low
17	Portal Screening	FEIS	SECONDARY FACTOR ENG-4	Utilities	Are there utilities available (sewer, telephone, water)?	Scale: Qualitative High: None available, high cost to bring in. Medium: Some utilities are available on or adjacent to the site. Low: All utilities are available on or adjacent to the site.	Medium	Low	Low
18	Portal Screening	FEIS	KEY FACTOR ENG - 8	Site Ground/Surface Water Pretreatment and Disposal	What is the degree of pretreatment and pipeline construction required to dispose dewatered groundwater at the portal site during construction activities?	Scale: Qualitative High: Major pipeline construction would likely be required. Medium: Both storm drain and sanitary sewer are available and minor pipeline construction and/or extensive pretreatment would likely be required. Low: Storm drain, sanitary sewer and natural surface drainage all are available and adjacent to the site and minor pretreatment may be required.	High	Medium (due to potential for contamination)	Low
OUTFALL									
19	Portal Screening	FEIS	KEY FACTOR OUT-1	Onshore Construction	What is the relative complexity of construction from the portal location to the waterline along the proposed outfall alignment?	Scale: Based on difficulty of construction access to the shoreline and onshore construction complexity (length, railroad crossings, and/or steep slopes). High: Shoreline not directly accessible and more complex onshore construction. Medium: Favorable shoreline access and more complex onshore construction. Low: Favorable shoreline access and less complex onshore construction.	Medium	Low	High
20	Portal Screening	FEIS	PRIMARY FACTOR OUT-1	Nearshore Construction	What is the pipeline segment length from the shoreline to a water depth of -80 feet MLLW along the proposed outfall alignment?	Scale: Based on the pipeline segment length, in feet, from the shoreline at MLLW to the -80 foot depth contour. High: > 1500 feet Medium: 500 to 1500 feet Low: < 500 feet	Low	Low	High
21	Portal Screening	FEIS	KEY FACTOR OUT-2	Construction Method Flexibility	Does the portal site location and its proposed alignment limit the flexibility to utilize multiple construction methods?	Scale: Based on the extent of limitations imposed on the use of construction methods by portal location and proposed alignment. High: Portal location and nearshore environment limit both tunnel and trench construction methods. Medium: Portal location and nearshore environment limit either tunnel or trench construction methods. Low: Portal location and nearshore environment do not limit construction methods.	Low	Low	Medium
22	Portal Screening	FEIS	SECONDARY FACTOR OUT-1	Forage Fish Habitat Disturbance - Tunnel Construction	To what extent would a tunnel alignment from this portal location disturb forage fish spawning habitat?	Scale: Based on the extent of potential disturbance to forage fish spawning habitat. High: High potential to disturb known/suspected forage fish spawning habitat. Medium: Low potential to disturb known/suspected forage fish spawning habitat. Low: No known forage fish spawning habitat along tunnel alignment.	Medium	Medium	Medium
23	Portal Screening	FEIS	SECONDARY FACTOR OUT-2	Forage Fish Habitat Disturbance - Trench Construction	To what extent would a trench alignment from this portal location disturb forage fish spawning habitat?	Scale: Based on the extent of potential disturbance to forage fish spawning habitat. High: High potential to disturb known/suspected forage fish spawning habitat. Medium: Low potential to disturb known/suspected forage fish spawning habitat. Low: No known forage fish spawning habitat along trench alignment.	High	High	High
24	Portal Screening	FEIS	KEY FACTOR OUT-3	Eelgrass Habitat Disturbance - Tunnel Construction	To what extent would a tunnel alignment from this portal location disturb eelgrass habitat?	Scale: Based on the extent of potential disturbance to eelgrass habitat. High: High potential to disturb known eelgrass habitat. Medium: Low potential to disturb known eelgrass habitat. Low: No known eelgrass habitat along tunnel alignment.	High	Medium	High
25	Portal Screening	FEIS	KEY FACTOR OUT-4	Eelgrass Habitat Disturbance - Trench Construction	To what extent would a trench alignment from this portal location disturb eelgrass habitat?	Scale: Based on anticipated area of eelgrass habitat disturbance in square feet.	< 7,000 sq ft	< 7,000 sq ft	< 35,000 sq ft
26	Portal Screening	FEIS	PRIMARY FACTOR OUT-2	Tribal Fisheries	Are tribal fisheries present along proposed outfall alignment from this portal location?	Scale: Based on presence and proximity of tribal fisheries along proposed outfall alignment. High: Known concentrated area of active fishery within 1000 feet of proposed outfall alignment. Medium: Known area of active fishery near outfall zone. Low: No known active fishery.	Medium	Medium	Medium
27	Portal Screening	FEIS	PRIMARY FACTOR OUT-3	Tribal Spot Prawn Areas	Are tribal spot prawn fisheries present along proposed outfall alignment from this portal location?	Scale: Based on presence and proximity of tribal spot prawn area along proposed outfall alignment. High: Known spot prawn area within 1000 feet of proposed outfall alignment. Medium: Known spot prawn area near outfall zone. Low: No known spot prawn area.	High	High	Low
COMMUNITY-ENVIRONMENTAL									
28	Portal Screening	FEIS	PRIMARY FACTOR ENVR-1	Archeological and Cultural Resources	Are archeological /cultural resources likely to be present at portal site?	Scale: Archeological/cultural resources present at proposed portal site. High: Archeological/cultural resources likely. Medium: Archeological/cultural resources possible. Low: Archeological/cultural resources unlikely.	Low	Medium	Medium
29	Portal Screening	FEIS	KEY FACTOR ENVR- 1	Endangered Species Act Compliance (terrestrial) – Conveyance	Would construction of the portal disrupt or cross habitat areas that support terrestrial wildlife species listed as threatened/endangered/candidate/ or state species of concern?	Scale: Based on a qualitative answer regarding the potential impacts to habitat areas for threatened / endangered / candidate / state species of concern. High: Documented presence of special status species or their suitable habitat on the site or up to 0.25 mile from the site. Medium: Documented presence of special status species or their suitable habitat between 0.25 mile and 0.5 mile from the site. Low: Documented presence of special status species or their suitable habitat 0.5 mile or more from the site. No: Lack of documented special status species.	High	High	High

Level 3 Portal Screening Criteria
Final - August 2003

Brightwater Conveyance : Portal Site Screening Level 3 Evaluation Matrix - Portal 19									
#	Component	Screening Round	Code	Topic	Questions	Scale	Site A	Site C	Site E
30	Portal Screening	FEIS	KEY FACTOR ENVR- 2	Endangered Species Act Compliance (aquatic) – Conveyance	Would construction of the portal disrupt or cross habitat areas that support aquatic species listed as threatened/endangered/candidate/ or state species of concern?	Scale: Based on a qualitative answer regarding the potential impacts to streams and/or their associated buffers at the potential portal site and, therefore, fish species listed as threatened/endangered/candidate/state species of concern. High: It is likely that the construction at the portal site would generate impacts onsite to a stream/buffer or convey impacts downstream to habitats that support listed fish species. Low: It is unlikely that the construction of the portal would generate impacts onsite to a stream/buffer or convey impacts downstream to habitats that support listed fish species. No: The construction of the portal would not generate impacts onsite to a stream/buffer or convey impacts downstream to habitats that support listed fish species.	High	Low	Low
31	Portal Screening	FEIS	PRIMARY FACTOR ENVR- 2	High Quality Upland Habitat	Would construction of the portal affect high-quality upland habitat?	Scale: Based on a qualitative answer regarding the potential impact to high-quality upland habitat. (High-quality upland habitat is defined as mature forest in natural condition.) Yes: Construction of the portal is likely to displace high quality upland habitat areas. No: Construction of the portal would not displace high quality upland habitat areas.	No	No	No
32	Portal Screening	FEIS	KEY FACTOR ENVR- 3	Wetlands	Would-construction of the portal affect wetlands or their buffers?	Scale: Based on the potential impact to wetlands or their associated buffers within the specific portal site. High: The portal site construction would impact a Class 1 or 2 wetland or adjacent buffer. Medium: The portal site construction would impact a Class 3 or 4 wetland. Low: The portal would impact a Class 3 or 4 wetland buffer. No: The portal would not impact a buffer or have no impact to wetlands or buffers.	Medium	No	Low
33	Portal Screening	FEIS	KEY FACTOR ENVR- 4	Stream Impacts	Would the construction of portals disrupt streams or their buffers?	Scale: Based on a qualitative answer regarding the potential impacts to streams and/or their associated buffers at the potential portal site. High: It is likely that the construction at the portal site would impact a stream or its buffer. Low: It is unlikely that the construction of the portal would impact a stream or its buffer. No: The construction of the portal would not impact a stream or its buffer.	High	Low	No
34	Portal Screening	FEIS	KEY FACTOR ENVR- 5	Natural Environment	Would the construction of portals permanently affect wetlands, streams, and/or their buffers, high quality upland habitat, or habitat for special status species?	Scale: Based on a quantitative estimate of area of permanent effects on regulated resources and their buffers or high quality upland habitat. High: Greater than 0.2-acre impact. Medium: Between 0.1 and 0.2-acre impact. Low: Less than 0.1-acre impact. No: No permanent impact.	High	No	Low
35	Portal Screening	FEIS	KEY FACTOR ENVR- 6	Traffic Disruption - Truck Haul Routes	To what extent would the truck haul routes utilize residential streets?	High: Uses significant amount of residential streets. Medium: Uses arterials with only minor use of residential streets. Low: No residential streets utilized.	High	High	High
36	Portal Screening	FEIS	PRIMARY FACTOR ENVR-3	Traffic Disruption - Duration Period	What would be the duration of disruption due to construction at the portal?	High: Construction of portal would require long-term (construction period) detours or blocked local access. Medium: Construction of portal would result in short-term (a few days) detours or blocked access. Low: Construction of portal would not require detours or blocked access.	High	Medium	Medium
37	Portal Screening	FEIS	PRIMARY FACTOR ENVR-4	Bicycle/Pedestrian	Is there regular bicycle or pedestrian traffic near this site because of an established trail or commute route?	High: Frequent bicycle and pedestrian traffic. Medium: Low or infrequent levels of bicycle and pedestrian traffic, or easily detoured or redirected. Low: No elevated levels of bicycle/pedestrian traffic.	Low	Low	Medium
38	Portal Screening	FEIS	SECONDARY FACTOR ENVR-1	Visual Resources	Would construction on the portal site cause visual impacts?	High: Site in highly visible location; minimal opportunities for screening or visual enhancement. Medium: Site in highly visible location; opportunities available for screening or visual enhancement. No: Site not located in highly visible location.	Low	Medium	High
39	Portal Screening	FEIS	SECONDARY FACTOR ENVR-2	Visual Resources	Would permanent facilities at the portal site cause visual impacts?	High: Site in highly visible location; minimal opportunities for screening or visual enhancement. Medium: Site in highly visible location; opportunities available for screening or visual enhancement. Low: Site not located in highly visible location.	Low	Low	Medium
40	Portal Screening	FEIS	SECONDARY FACTOR ENVR-3	Visual Resources	Would construction be in line-of-sight (night light glare)?	Scale: Qualitative scale based on neighboring facilities. High: Residence in line-of-sight. Medium: Business (day use only) in line-of-sight. Low: Nothing in line-of-sight.	Low	Medium	High
41	Portal Screening	FEIS	SECONDARY FACTOR ENVR-4	Air Quality	Would construction at the portal impact the air quality of receptors?	High: Receptors immediately adjacent to portal site, impacts possible. Medium: Receptors more than 500 feet from portal site, impacts not likely. Low: No receptors in immediate vicinity of portal site, no impacts anticipated.	High	Medium	High
42	Portal Screening	FEIS	SECONDARY FACTOR ENVR-5	Air Quality	Would operation of the facilities at the portal impact the air quality of receptors?	High: Receptors immediately adjacent to portal site, impacts possible. Medium: Receptors more than 500 feet from portal site, impacts not likely. Low: No receptors in immediate vicinity of portal site, no impacts anticipated.	High	Medium	High
43	Portal Screening	FEIS	KEY FACTOR ENVR-7	Noise	How discernible would construction noise be in the vicinity of the portal site?	High: Low existing ambient noise. Medium: Moderate existing ambient noise. Low: High existing ambient noise.	High	Medium	High
44	Portal Screening	FEIS	SECONDARY FACTOR ENVR-6	Landmarks	Would any officially designated local landmark (building, object, or structure) be impacted by construction or the completed portal?	High: An officially designated local landmark would be permanently impacted during construction or by the completed project. Medium: An officially designated local landmark would be temporarily impacted during construction - there would be no impact by the completed portal. Low/No: There would be no impacts either by construction or the completed portal.	Low	Low	Low
45	Portal Screening	FEIS	KEY FACTOR ENVR-8	Land Use	Would there be potential for public shared uses of the portal site after construction?	Scale: Yes or No?	Yes	No	Yes

Level 3 Portal Screening Criteria
Final - August 2003

Brightwater Conveyance : Portal Site Screening Level 3 Evaluation Matrix - Portal 19									
#	Component	Screening Round	Code	Topic	Questions	Scale	Site A	Site C	Site E
46	Portal Screening	FEIS	SECONDARY FACTOR ENVR-7	Land Use	Would the use of the site after construction be the same as the existing use?	Scale: Yes or No?	No	Yes	Yes
47	Portal Screening	FEIS	KEY FACTOR ENVR-9	Dewatering	Would dewatering discharge at the portal site result in impacts to water bodies (e.g., wetlands, streams, lakes)?	Scale: Qualitative Assessment: High, Medium, or Low	Low	Low	Low
48	Portal Screening	FEIS	SECONDARY FACTOR ENVR-8	Dewatering	Is there a receiving water (e.g., wetland, stream, lake) in sufficient proximity to the portal site to receive dewatering water, if the dewatering water cannot all be discharged to a storm or sanitary sewer?	Scale: Yes or No?	No	Yes	Yes
49	Portal Screening	FEIS	SECONDARY FACTOR ENVR-9	Contamination	What would be the potential for encountering contaminated soils and/or groundwater?	High: The site has historical or current uses that could contribute to soil/groundwater contamination. Medium: Parcels in the vicinity of the land have historical or current uses that could contribute to soil/groundwater contamination of the subject property. Low: Known/documented contamination not on or immediately adjacent to portal site.	Low	High	Low
PERMITTING									
50	Portal Screening	FEIS	SECONDARY FACTOR PER-1	Land Use	Would the project facilities on the portal site be allowed under the existing development regulations?	Scale: Yes or No?	Yes	Yes	Yes
51	Portal Screening	FEIS	SECONDARY FACTOR PER-2	Land Use	Would construction or operation require a shoreline permit?	Scale: Yes or No?	No	Yes	Yes
LAND ACQUISITION & JURISDICTIONAL									
52	Portal Screening	FEIS	PRIMARY FACTOR LAND-1	Relative Number of Acquisition Parcels	What is the estimated total number of private property acquisitions in the portal site?	Scale: Quantitative value based upon the number of parcels required.	1	1	1
53	Portal Screening	FEIS	SECONDARY FACTOR LAND-1	Relative Level of Property Development	What is the relative level of development and known permitted development on the portal site?	High: Highest existing structures. Middle: Middle permitted and masterplans, level of development. Low: Lowest impacts.	L	L	L
54	Portal Screening	FEIS	KEY FACTOR LAND-1	Legal Restrictions on Title	Are there existing legal restrictions to title in the portal acquisition site which would prevent or limit planned construction?	High: Title restrictions severely limit available useable land area and are difficult or impossible to remove. Medium: Some title restrictions exist but can be removed with some effort or project can be adapted to accommodate. Low: Title restrictions do not limit available useable land.	L	L	L
55	Portal Screening	FEIS	PRIMARY FACTOR LAND-2	Complexity of Relocations - Conveyance	How difficult and time-consuming will it be for occupants in the portal site areas to relocate?	High: Relocations include unique businesses with unique site requirements. Medium: Relocations are likely to be complex and disruptive, but occupants appear to be reasonably able to relocate. Low: Relative level of complexity in occupant relocations appear to be low.	L	L	L
56	Portal Screening	FEIS	SECONDARY FACTOR LAND-2	Residential Construction Disruption - Temporary	What is the temporary construction disruption on residential property uses adjacent to portal site areas?	High: Appear to have the highest levels of temporary residential disruption in potential portal areas. Medium: Appear to have mid-level impacts of temporary residential disruption in potential portal areas. Low: Appear to have the lowest levels of temporary residential disruption in potential portal areas.	M	L	L
57	Portal Screening	FEIS	PRIMARY FACTOR LAND-3	Residential Construction Disruption - Permanent	What is the permanent construction disruption on residential property uses adjacent to portal site areas?	High: Appear to have the highest levels of permanent residential disruption in potential portal areas. Medium: Appear to have mid-level impacts of temporary residential disruption in potential portal areas. Low: Appear to have the lowest levels of temporary residential disruption in potential portal areas.	L	L	L
58	Portal Screening	FEIS	SECONDARY FACTOR LAND-3	Commercial Construction Disruption - Temporary	What is the temporary construction disruption on commercial property uses adjacent to portal site areas?	High: Appear to have the highest levels of temporary commercial disruption in potential portal areas. Medium: Appear to have mid-level impacts of temporary residential disruption in potential portal areas. Low: Appear to have the lowest levels of temporary residential disruption in potential portal areas.	L	M	L
59	Portal Screening	FEIS	PRIMARY FACTOR LAND-4	Commercial Construction Disruption - Permanent	What is the permanent construction disruption on commercial property uses adjacent to portal site areas?	High: Appear to have the highest levels of permanent commercial disruption in potential portal areas. Medium: Appear to have mid-level impacts of temporary residential disruption in potential portal areas. Low: Appear to have the lowest levels of temporary residential disruption in potential portal areas.	L	L	L
60	Portal Screening	FEIS	KEY FACTOR LAND-2	Required Surface Easements	What is the estimate of private surface property interests (not in public right-of-way) that must be acquired to improve proposed transportation connections to specific portal site.	Scale: Quantitative number of easement properties.	1	0	0
61	Portal Screening	FEIS	KEY FACTOR LAND-3	Adjacent Subsurface Easements	What is the estimate of private subsurface property interests (not in public right-of-way) that must be acquired to join subject portal site to the proposed conveyance corridor.	Scale: Quantitative number of easement properties.	1	0	0
FINANCIAL									
62	Portal Screening	FEIS	SECONDARY FACTOR FIN-1	Relative Cost of Site Acquisition and Relocation	What is the estimated total relative cost of private property acquisitions and relocations in the portal site area?	High: Highest cost Medium: Moderate cost Low: Lowest cost	M	M	L
MITIGATION OPPORTUNITIES									
63	Portal Screening	FEIS	SECONDARY FACTOR MIT-1	Onsite Compensatory Natural Resource Mitigation Potential	What amount of land is available outside of the facility footprint for on-site mitigation such as creation, restoration, and/or enhancement of uplands, wetlands, stream, and/or buffers?	High: Relatively highest level of acreage exists to provide onsite natural resource mitigation for identified impacts. Medium: Relatively medium level of acreage exists to provide onsite natural resource mitigation for identified impacts. Low: Relatively low level of acreage exists to provide onsite natural resource mitigation for identified impacts.	Low	High	Medium

Appendix C

Evaluation Summary of Portal 19 Level 3 Candidate Sites

ROUTE 9 Effluent Conveyance - Portal E19

Portal Information

Function	TBM Launch
Location	Richmond Beach DR NW and NW 205th Street
Jurisdictions	Woodway, Shoreline, Edmonds
Permanent Facilities	Transition Structure; Sampling Station (below ground)
Portal Diameter	50 feet (Or 40 ft by 100 ft square excavation)
Portal Depth	40 feet
Length of Activity	3.5 years
Portal Excavated Volume	4,000 CY
Tunnel Excavated Volume	107,000 CY (for tunnel from portal 5 to 19)
Nearest Substation	Westgate, Richmond Park

Evaluation of Portal Sites

OVERALL EVALUATION
All three candidate sites are suitable for portal construction. Of the three candidate sites, site E19-A is the only site that would result in construction-related impacts to wetlands, streams, and buffers. Site E19-C is preferred because proposed outfall alignments from the site would minimize or avoid potential disturbance to environmental resources, limit onshore and nearshore segment lengths, and provide favorable shoreline access.
ENGINEERING
All three candidate sites meet engineering criteria and are suitable for portal construction. Site E19-C has the advantage of having a large flat area with flexibility for construction staging and minimum civil site work required. It also offers the shortest tunnel length. Both storm drain and sanitary sewer are available on site E19-C, however extensive pretreatment would likely be required due to anticipated contamination of groundwater. Site E19-A requires complex and extensive civil site work and a new access road. Major pipeline construction would likely be required to discharge to the nearest storm drain or sanitary sewer. Site E19-E provides options to dispose dewatering groundwater to a nearby storm drain, sanitary sewer, or natural drainage with minor pretreatment. However, the length of tunnel from site E19-E to the tunnel corridor is significantly high.
ENVIRONMENTAL / COMMUNITY
All three candidate sites are within the Edmonds bald eagle territory designated by the Washington Department of Fish and Wildlife (WDFW). Within this territory are three bald eagle nests that are approximately 1 mile away from the candidate sites. The bald eagle is listed as threatened by the U.S. Fish and Wildlife Service (USFWS). Of the three candidate sites, site E19-A is the only site that would result in construction related impacts to wetlands, streams, and buffers. None of the candidate sites would result in impacts to forested uplands. All three sites are located adjacent to a single-family residential neighborhood and would be accessed from neighborhood streets.
OUTFALL
All three candidate sites are suitable for outfall construction. Site E19-C is preferred because proposed outfall alignments from the site would minimize or avoid potential disturbance to environmental resources, limit onshore and nearshore segment lengths, and provide favorable shoreline access. Outfall construction from site E19-A would require an additional onshore pipeline segment that would traverse a steep slope and require a railroad line crossing. Outfall construction methods from site E19-E may be limited by the length of the nearshore segment and the presence of dense eelgrass habitat. There is no direct shoreline access at site E19-E.
PERMITTING
The proposed project facilities would be allowed at each site under existing development regulations. A shoreline substantial permit would be required for construction at portal sites E19-C and E19-E. A shoreline permit may also be required for construction of the outfall pipeline from a portal at site E19-A if an open-trench method is utilized.
LAND ACQUISITION
All three candidate sites have sufficient vacant area for projected project needs. Site E19-A will require easements for access improvements and tunnel connection to the outfall. Site E-19-E will require multiple tunnel alignment connection easements and is separated from the outfall by railroad tracks. Site E-19-C combines the outfall tunnel and portal area into one property.

Portal Sites Comparison

Features	Site E19-A	Site E19-C	Site E19-E
Size & Current Use	1.91 acre; Undeveloped (Vacant) Land	8.52 acre; Petroleum Refining	3.40 acre; Utility - Public
Engineering			
Access	New access road needs to be constructed.	Improvement on existing access way likely required.	Existing access way is adequate with minor improvement.
Tunnel	The length of the tunnel from the tunnel corridor to the portal site is estimated to be 300 feet.	The length of the tunnel from the tunnel corridor to the portal site is estimated to be 100 feet.	The length of the tunnel from the tunnel corridor to the portal site is estimated to be 1,200 feet.
Civil Site Work	Major earthwork to remove hillside and retaining wall construction required.	Requires little or no alteration.	Moderate earthwork required to create level construction area.
Stormwater/Groundwater Disposal	Pipeline construction would likely be required to discharge water to nearest storm drain or sanitary sewer.	Both storm drain and sanitary sewer are available onsite, however, pretreatment would likely be required due to anticipated contamination of groundwater.	Storm drain, sanitary sewer and natural surface drainage are available adjacent to the site. Groundwater may be disposed of after minor pretreatment.
Outfall			
Construction	Portal site does not restrict construction method. Onshore pipeline (1,500 ft) requires installation down a steep slope and railroad crossing. Favorable shoreline access and 450 ft nearshore pipeline segment.	Portal site does not restrict construction method. Onshore pipeline (1,000 feet) installation would have no significant obstacles. Favorable shoreline access and 450 ft nearshore pipeline segment.	Trench construction from portal site may be limited by broad, dense areas of eelgrass habitat. Onshore construction would be minimal, but shoreline is not directly accessible. 1,800 ft nearshore pipeline segment.
Eelgrass Habitat Disturbance	Risk of tunnel access shaft in eelgrass habitat is low. Trench alignments from portal site can minimize or avoid potential disturbance to eelgrass habitat.	Risk of tunnel access shaft in eelgrass habitat is low. Trench alignments from portal site can minimize or avoid potential disturbance to eelgrass habitat.	Risk of tunnel access shaft in eelgrass habitat is high due to length of alignment. Large area of eelgrass habitat disturbed by trench alignment, which cannot be avoided.
Community/Environment			
Endangered Species Act (ESA)	The site is within the Edmonds bald eagle territory designated by WDFW. Three documented bald eagle nests are located approximately 1 mile away. The bald eagle is listed as threatened by USFWS.	The site is within the Edmonds bald eagle territory designated by WDFW. Three documented bald eagle nests are located approximately 1 mile away. The bald eagle is listed as threatened by USFWS.	The site is within the Edmonds bald eagle territory designated by WDFW. Three documented bald eagle nests are located approximately 1 mile away. The bald eagle is listed as threatened by USFWS.
Wetland / Stream Impacts	Construction at this site would result in approximately 0.18 acres of impact to wetlands, 1 acre of impact to stream and wetland buffers, and 155 linear feet of stream diversion.	No impact to streams, wetlands, or buffers.	No impact to streams, wetlands, or buffers.
Upland Habitat (Forest)	No impact to forested upland habitat.	No impact to forested upland habitat.	No impact to forested upland habitat.
Traffic Impacts	Impacts would likely be significant because of the need to use residential streets. Access options are limited.	Impacts could be significant if access is limited to the existing road system. However, this site offers the potential to use barge transportation for deliveries as well as shipment of spoils. Rail transport could also be an option.	Impacts would likely be significant because of the need to use residential streets. Access options are limited.
Contamination	Contamination is likely not present on this site.	The potential for encountering contamination on this site is high due to past and current industrial operations.	The County's Richmond Beach Pump Station is located on this site. Contamination is likely not present on this site.
Land Acquisition			
Legal Restriction	Low	Low	Low – King County ownership
Required Easements	2	1	4
Construction Impacts	Higher elevation with distant residential neighboring properties.	Appears to be sufficient area and location to buffer construction from other uses.	Location is in view of multiple residential neighbors; however, impact should be small.